

*Borden*

THE CORPS RESPONDS:  
A HISTORY  
OF THE SUSQUEHANNA  
ENGINEER DISTRICT and  
TROPICAL STORM AGNES

Report Documentation Page				Form Approved OMB No. 0704-0188	
Public reporting burden for the collection of information is estimated to average 1 hour per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to Washington Headquarters Services, Directorate for Information Operations and Reports, 1215 Jefferson Davis Highway, Suite 1204, Arlington VA 22202-4302. Respondents should be aware that notwithstanding any other provision of law, no person shall be subject to a penalty for failing to comply with a collection of information if it does not display a currently valid OMB control number.					
1. REPORT DATE <b>1976</b>		2. REPORT TYPE		3. DATES COVERED <b>00-00-1976 to 00-00-1976</b>	
4. TITLE AND SUBTITLE <b>The Corps Responds: A History of the Susquehanna Engineer District and Tropical Storm Agnes</b>				5a. CONTRACT NUMBER	
				5b. GRANT NUMBER	
				5c. PROGRAM ELEMENT NUMBER	
6. AUTHOR(S)				5d. PROJECT NUMBER	
				5e. TASK NUMBER	
				5f. WORK UNIT NUMBER	
7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES) <b>U.S. Army Corps of Engineers,Baltimore District,10 South Howard St City Crescent Bldg,Baltimore,MD,21201</b>				8. PERFORMING ORGANIZATION REPORT NUMBER	
9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS(ES)				10. SPONSOR/MONITOR'S ACRONYM(S)	
				11. SPONSOR/MONITOR'S REPORT NUMBER(S)	
12. DISTRIBUTION/AVAILABILITY STATEMENT <b>Approved for public release; distribution unlimited</b>					
13. SUPPLEMENTARY NOTES					
14. ABSTRACT					
15. SUBJECT TERMS					
16. SECURITY CLASSIFICATION OF:			17. LIMITATION OF ABSTRACT <b>Same as Report (SAR)</b>	18. NUMBER OF PAGES <b>59</b>	19a. NAME OF RESPONSIBLE PERSON
a. REPORT <b>unclassified</b>	b. ABSTRACT <b>unclassified</b>	c. THIS PAGE <b>unclassified</b>			



**Cover:**  
**North Street Bridge, Wilkes-Barre,**  
**Pennsylvania – washed out during**  
**Tropical Storm Agnes 1972.**

# **THE CORPS RESPONDS: A HISTORY OF THE SUSQUEHANNA ENGINEER DISTRICT and TROPICAL STORM AGNES**

**By Paul K. Walker**

## **The Author**

Paul K. Walker, a specialist in early American history, holds a Ph.D. degree from the University of North Carolina, Chapel Hill. He has taught history at Towson State and Western Maryland Colleges. At present he is working on a documentary history of the Corps of Engineers in the American Revolution.

**U. S. ARMY ENGINEER DISTRICT,  
BALTIMORE CORPS OF ENGINEERS**




# Foreword

In late June 1972, floodwaters resulting from Tropical Storm Agnes caused millions of dollars in damage in the eastern section of the United States. Most of the damage from the storm, called the worst natural disaster in the history of the United States, occurred in parts of Virginia, Maryland, Pennsylvania and New York. Confronted with a massive clean-up and recovery task, state and local officials — particularly in Pennsylvania's hard-hit Susquehanna River Basin — turned to the Federal government for help. The Office of Emergency Preparedness (OEP) coordinated the Federal response and relied heavily on the Corps of Engineers' proven expertise in disaster relief.

The Corps acted quickly, with an initial effort channeled through existing districts in the North Atlantic Division. In July, as it became clearer that the scope of the clean-up and recovery would be tremendous, Corps officials looked for new ways to meet the growing challenge. The solution was bold. The Corps created a new administrative entity — the Susquehanna Engineer District. To this district went sole responsibility for dealing with work in Pennsylvania and New York under the Disaster Relief Act of 1970. From the begin-

ning the Corps intended that the Susquehanna District be short-lived. The district existed only from 17 July to 15 November 1972, but during that period it carried out missions ranging from debris removal, temporary bridging and mobile home site construction to temporary home repairs. In all, district contracts exceeded \$80 million.

In this study, the author examines the Corps' response to Tropical Storm Agnes, focusing in depth on the formation of the Susquehanna District, its mission performance and its subsequent deactivation. The result is a treatment of value not only to the general reader interested in federal disaster assistance but also to the Corps of Engineers itself. The author concludes that "the Agnes experience demonstrated . . . that each disaster has a character all its own, that no single response is possible, and that the federal agencies fighting the disaster must have flexibility." The Susquehanna District experiment is viewed not as a model for future action but as a timely response to a unique situation. Still, the lessons learned in the Agnes disaster can be fruitfully applied in planning for other emergency operations.

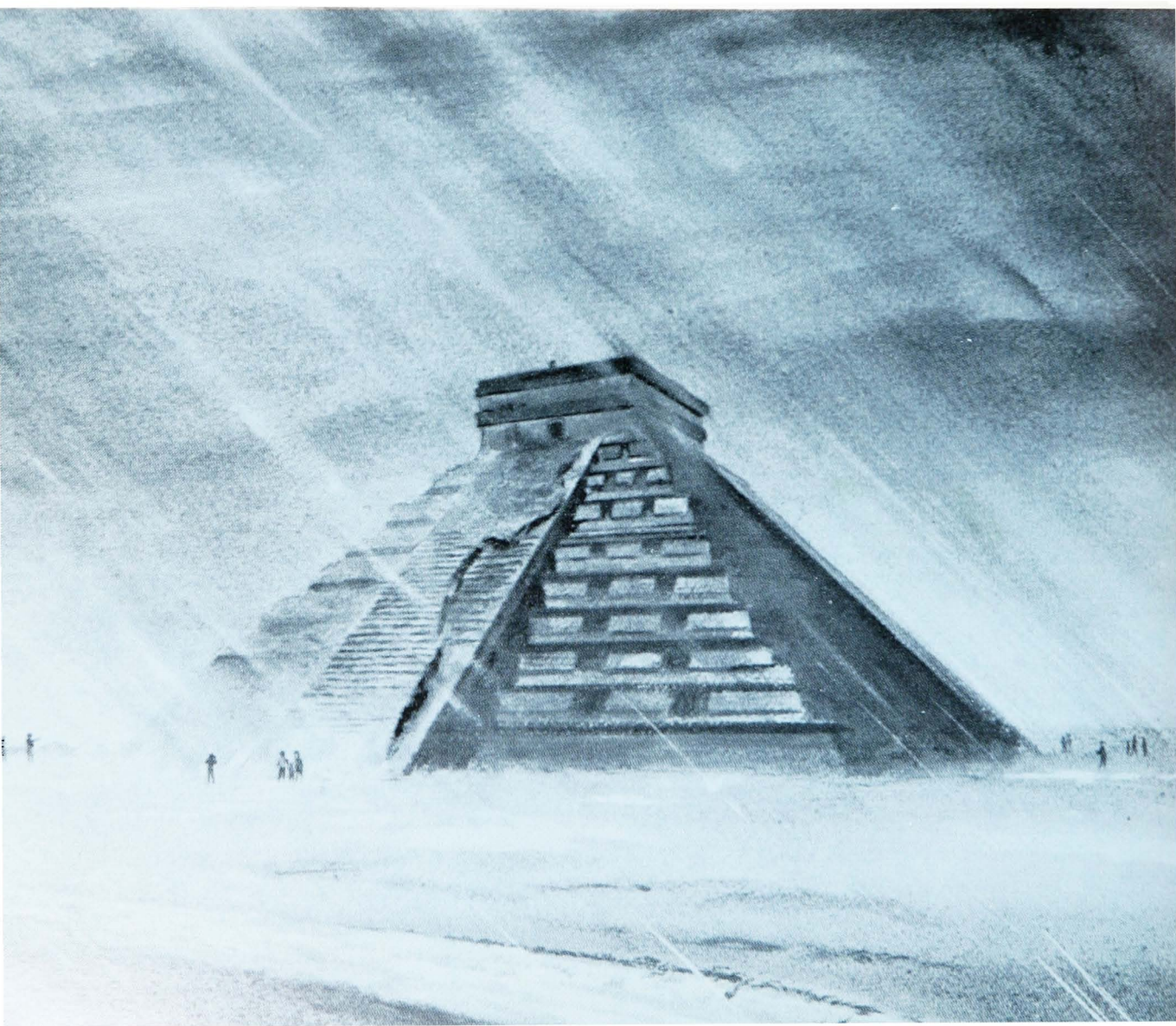


ROBERT S. MCGARRY  
BRIGADIER GENERAL, CORPS OF ENGINEERS  
DISTRICT ENGINEER

# Contents

Chapter	Page
I. Introduction: The Storm and First Response . . . . .	1
II. A New Engineer District Is Formed . . . . .	11
III. Debris Removal, Mobile Homes and Mini-Repair . . . . .	21
IV. Secondary Mission Assignments . . . . .	37
V. Deactivation and Assessment . . . . .	43
NOTES . . . . .	47
BIBLIOGRAPHY . . . . .	51
ACKNOWLEDGEMENTS . . . . .	52





# Chapter I - Introduction: The Storm and First Response

Tropical Storm Agnes, opening the 1972 hurricane season, developed off Mexico's Yucatan Peninsula as a tropical depression on 15 June 1972. Three days later she was designated a hurricane. After striking land near Panama City, Fla., on the 19th, the storm lost hurricane force and was downgraded to a tropical depression. But Agnes sustained herself for days to come. Moving across Georgia and the Carolinas, she intensified again as she neared the Atlantic. Her passage along the New Jersey coast on 22 June was part of a typical tropical storm pattern. What followed was not.

The afternoon of 22 June 1972 Tropical Storm Agnes turned inland near New York City, headed westward through northern Pennsylvania and southern New York, and merged with a broad non-tropical low pressure system in central Pennsylvania. The results were disastrous.

Since first touching land, the storm was characterized by rain rather than wind. Heavy rainfall, not unusual in a storm of this type, occurred from Florida to New England. Yet Agnes stood apart from most of her predecessors because of the breadth of the area touched by her rains.<sup>1</sup> Rainfall totaled about 28.1 trillion gallons, nearly half of which fell in Pennsylvania and New York. Totals averaged eight to 12 inches throughout central Pennsylvania and exceeded 12 inches in several areas.

Greatly complicating the effects of Agnes' rainfall was the fact that rains earlier in June

had already soaked the land from Virginia to New England. Now, small creeks and streams turned almost instantly into raging torrents. Larger rivers swelled tremendously. At Harrisburg on Wednesday morning the 21st of June, the Susquehanna was 4.82 feet high, only slightly above normal. The next day, the river rose from 11.29 feet at 7 a.m. to 24.1 feet by 9 p.m. Such rapid developments caught many by surprise: flood-warning systems did not function with full effectiveness.

As always, chance and unpredictability played a part. Had Agnes dumped her rains further east, for example, the effect in Wilkes-Barre would have been quite different. The city's rainfall, less than six inches, was actually small compared to many areas. But placement of heaviest amounts along the upper reaches of the Susquehanna and its tributaries hurt. The water eventually had to go by Wilkes-Barre.

The circumstances surrounding Agnes resulted in severe flooding nearly everywhere. Now the flood record books would also need revising. At Richmond, Va., where the previous record of 30 feet had stood since 1771, the James crested at 36.5 feet. On the main branch of the Susquehanna River in Pennsylvania crests were 12 to 18 feet above flood stage, surpassing levels of the 1936 flood of record.

At noon on 24 June the Susquehanna crested in Harrisburg just under 33 feet, almost four feet above the previous record. At that moment, 965,000 cubic feet of water per second rushed past the state capital. A record



650 billion gallons of water passed Harrisburg that day. New York's Chemung River, which flows through Corning and Elmira, created a lake four miles wide between the two cities.

The Chemung also overtopped flood protection levees in Corning and Elmira. The Susquehanna did likewise in Wilkes-Barre, where water exceeded protective walls in several places by five feet despite frantic sandbagging efforts. At Sunbury, Pa., where the main and west branches of the Susquehanna join, water lapped the top of the levees.

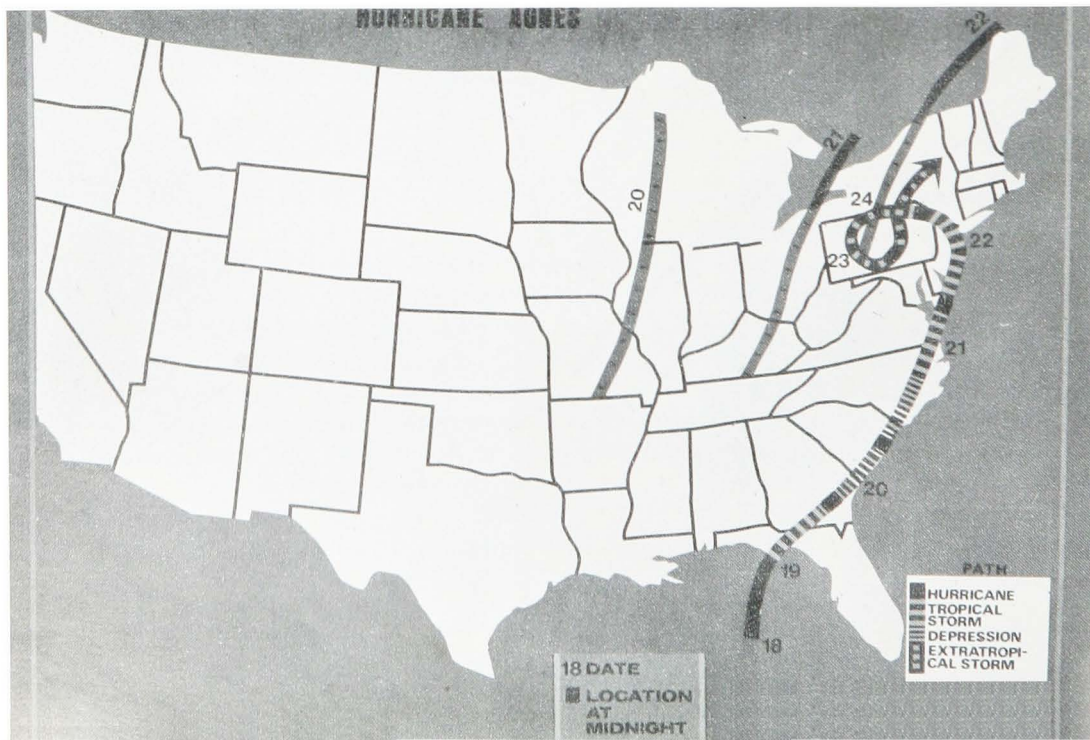
By surpassing the greatest anticipated volume for flood protection devices in so many cases, Agnes' floodwaters shattered planners' calculations. Their only consolation was that the walls at Sunbury held and that dams — including one under construction by the U.S. Army Corps of Engineers — prevented more than \$488 million in damages in the Susquehanna basin, mostly along the western branch of the river.

By the time Tropical Storm Agnes left the continental United States, she was already being classified as the greatest natural disaster in United States history. Total losses ultimately exceeded \$4 billion. Remarkably, fatalities related to the storm were comparatively low. Twenty deaths occurred in Maryland, 31 in New York, 48 in Pennsylvania, and 13 in Virginia. Total deaths were 122.

Damages, extensive all along the storm's path, were greatest in eastern Pennsylvania and southern New York. There the combination of heavy rains and flash floods was devastating, especially in the vicinity of Wilkes-Barre and Corning-Elmira. In Wilkes-Barre, a city of some 58,000 located on the east side of the Susquehanna in Pennsylvania's Wyoming Valley, about one-third of the city's homes were damaged by water that exceeded 20 feet in depth. More than 100,000 people fled their homes. All but 20 of 6000 homes in Kingston, a smaller city just across the river, suffered flood damage. The water in Kingston ranged in depth from 15 to 20 feet.<sup>2</sup> The flooding cut off power, telephone and sewer service in large areas of the Wyoming Valley. Roads were impassable and bridges were swept away. At Forty Fort, a borough a few miles northeast of Wilkes-Barre, the Susquehanna breached the levees, crashed into a 195-year-old burial ground, and disinterred an estimated 2000 bodies.

In the Corning-Elmira area, a similar situation prevailed. More than 80 percent of Elmira's phone service was cut off; and, in Corning, flooding interrupted natural gas service to 90 percent of the local users.

Damage to crops in Virginia exceeded \$14 million. Pennsylvania's agriculturally rich York County was also hit hard. In the upper Chesa-









Sandbaggers Flee Advancing Waters





peake Bay, crabs and oysters were severely affected by the storm-caused influx of debris, silt and fresh water. In Harrisburg, the Pennsylvania state capital, water covered most of the center city. The first floor of the governor's mansion was flooded. Inundation by mud- and debris-laden water, rather than the velocity of the water, accounted for most of the damages.

Agnes hit businesses throughout the Susquehanna River valley hard. More than 2700 of the Wyoming Valley's commercial establishments, most in downtown Wilkes-Barre, experienced some kind of flood damage. These were concerns which had accounted for 80 percent of business sales and receipts in 1967. Also sustaining damage in the downtown section of Wilkes-Barre were Kings and Wilkes Colleges, the city hall, post office and several schools. Losses in the Wyoming Valley were eventually calculated in excess of \$1 billion, while, incredibly, only six lives were lost.

The Corning Glass Works and the Ingersoll-Rand Company, each employing about 6000 workers at the time of the flood, suffered damage in the millions. IBM and Xerox suffered heavy losses to leased equipment in customers' hands throughout the flood area. Manhattan Industries set damage at its Wilkes-Barre facilities at \$5.5 million. Damages at Mrs. Smith's Pie Company in Pottstown, Pa., were \$900,000. In Harrisburg, water flooded the plant of *The Patriot-News*, the city's major newspaper.

Not all businesses were so fortunate to carry flood insurance as was Corning Glass. Indeed, Manhattan Industries said their losses were largely uninsured. Some companies simply closed down, while others sought recovery through government loans. Widespread flood damage in New York was the final blow forcing the Erie-Lackawanna Railroad to declare bankruptcy. In Kingston, the Interstate Brands Corporation decided not to reopen a heavily damaged cake plant.

With business activity interrupted, unemployment rose. Bethlehem Steel plants in Pottstown and Steelton, Pa., each laid off 5000 workers. At the beginning of July, more than 50,000 people were reported to be out of work state-wide due to the storm.

In light of such devastating damage, Tropical

Storm Agnes taxed local and state resources to the limit. On 23 June, recognizing that they could not act alone, the governors of Florida, Virginia, Maryland, Pennsylvania and New York asked President Nixon to declare their states major disaster areas. The President responded favorably that same day; declarations for West Virginia and Ohio followed in July. The Office of Emergency Preparedness (OEP), at the time charged with directing federal disaster response, then determined which counties and independent cities within those states were eligible for relief under Public Law 91-606, the Disaster Relief Act of 1970, enacted by Congress on 31 December 1970. OEP eventually found eligible all of Pennsylvania's 67 counties, 26 of New York's 62 counties, 72 of Virginia's 96 counties, the independent city of Baltimore, and 22 of Maryland's 23 counties.

Public Law 91-606 had consolidated existing federal disaster legislation and set new standards including a prohibition on discrimination in providing relief and establishment of minimum standards to be used in constructing new buildings. The law set down several ways whereby federal agencies might aid disaster victims. These included lending personnel, facilities, supplies and equipment to state and local governments, with or without compensation; performing emergency debris removal and repairs to damaged state and local government facilities; distributing food and medical supplies; and providing emergency shelter. The director of OEP, the man charged with coordinating federal relief, was specifically authorized to use federal agencies or make grants to individual states to remove debris and wreckage from both public and private lands and to provide temporary housing or emergency shelter to disaster victims. Under Public Law 91-606, federal spending was to give preference to local residents and businesses.

Normal OEP structure expanded to deal with the Agnes disaster. President Nixon appointed a federal coordinating officer for each state. It was his job to ascertain relief requirements and to work closely with state officials. Each federal coordinating officer established a disaster assistance field office consisting of representatives of federal, state and local



government agencies and of private relief organizations such as the American Red Cross. General George A. Lincoln, OEP director at the time of Agnes and a veteran of the U.S. Army Corps of Engineers, ordered emergency support teams put together on a temporary duty basis from federal departments and agencies to help the coordinating officers. The field offices coordinated all federal assistance to public entities and private individuals. OEP also established 93 individual assistance centers to inform victims of available help and how to apply for it. Nearly half were set up in Pennsylvania. The field office located in Harrisburg and a sub-field office in Wilkes-Barre. Money to carry out federal assistance programs came from the existing President's Disaster Relief Fund, from special funds of the Small Business and Farmers Home Administrations, and from supplemental appropriations passed by Congress after Agnes.<sup>3</sup>

Considering the magnitude of the disaster, federal response to Agnes mobilized quickly under the direction of OEP. Some far-reaching promises were made. On 23 June, for example OEP official Francis X. Carney pledged temporary housing for disaster victims in 90 days. Although OEP had direct control over all programs drawing upon the disaster fund, the agency handled the work by issuing legal documents in the form of mission assignments. These ordered other government agencies to complete tasks particularly suited to their ability.

One organization OEP relied upon heavily was the U.S. Army Corps of Engineers. The Corps had performed disaster relief before and, as will be demonstrated, stood ready to do so again. As Carney later stated:

The Corps of Engineers is the best contracting agency in the U.S. Government. When we need contracting for debris removal, mini repair, such mission assignments go to the Corps.<sup>4</sup>

Even before OEP had begun to mobilize the federal effort under Public Law 91-606, the Corps of Engineers had moved into action. The

Corps acted on the basis of the disaster provisions of its own Engineer Regulations, in accordance with Public Law 84-99, and in expectation of imminent mission assignments from OEP. Traditionally, Public Law 84-99, passed by Congress in the mid-1950's, served as the basis for any emergency measures taken by the Corps before major disaster areas had been designated. The law placed a fund directly under the auspices of the Chief of Engineers for tasks including flood emergency preparation, flood fighting and rescue operations, and repair of any flood control work threatened or destroyed by flood. Repairs made under this legislation were considered permanent in nature.

As far as the Corps of Engineers was concerned, Tropical Storm Agnes was unique in that the bulk of her destruction occurred within a single division of the Corps' organization — the North Atlantic Division (NAD) — where Major General Richard H. Groves was the division engineer. Damage was heaviest in the division's Baltimore District where Colonel Louis W. Prentiss, Jr., was district engineer. NAD was one of the largest divisions in the Corps in terms of contracted workload, and within the division, the Baltimore District had by far the heaviest workload. At the time Agnes struck, both division and district were deeply involved in normal civil and military construction jobs. Nevertheless, on 20 June General Groves ordered his district engineers "to mobilize and to contact all available contractors in anticipation of the expected flood fight and relief work."<sup>5</sup>

As Agnes approached, emergency operations control centers were activated at the Office of the Chief of Engineers in Washington, D.C.; at NAD headquarters in New York City; at the headquarters of other affected divisions; and at the offices of the districts involved. The Baltimore District's emergency operations control center began 24-hour operations on 21 June. Advance survey teams reached Harrisburg and Luzerne County, Pa., on 23 June. The New York Engineer District took over emergency relief work for the New York portion of the Susquehanna basin at the direction of the division engineer, while Colonel Prentiss



ordered the establishment of 14 disaster area offices within Baltimore District's civil works boundaries.

On Friday, 23 June, members of the newly established Wilkes-Barre Area Office arrived in the flood area. Led by Major Gerald A. Vick, assistant district engineer for civil works in Baltimore, the group set up headquarters in a hangar at the Naval Reserve Center in Avoca, Pa. There they joined Congressman Daniel J. Flood, U.S. Representative for Pennsylvania's 11th District, who was tirelessly overseeing early emergency rescue operations. After an aerial survey the following day, Chief of Engineers Frederick J. Clarke instructed that Corps military and civilian personnel be sent to the disaster area on temporary assignment.

Initially 68 officers were taken from the Engineer Officer Advanced School at Fort Belvoir, Va.; other personnel came from engineer districts ranging from Fort Worth, Texas to New England. A Wilkes-Barre newspaper declared:

Wyoming Valley has become a

melting pot of federal agency employees, military units and disaster services from across the country.<sup>6</sup>

Soon men and women with buttons proclaiming "The Corps Cares" were everywhere. Throughout the first phase of emergency operations, elements of the U.S. First Army, headquartered at Fort Meade, Md., and units of the Pennsylvania National Guard, the Army Reserves, and Navy Seabees augmented Corps personnel.

In a tremendous manpower mobilization effort, most personnel arrived at division, district and area offices within the Agnes disaster region between 25 and 28 June. Emergency offices established within the Baltimore District were manned almost entirely with borrowed people. "There was no way with my existing organization alone that I could have handled the emergency effectively," Prentiss recalled.<sup>7</sup>

A buildup of emergency work strength continued to parallel the expanding emergency effort. On 5 July, Corps personnel in the Wilkes-Barre area included 11 officers and 40





civilians. They were aided by 700 local workers and over 6000 military personnel. A week later, the Wilkes-Barre Area Office counted 84 civilian and military personnel.

The Office of Emergency Preparedness issued the first formal mission assignment to the Corps of Engineers on 26 June. Under its terms, the Corps was to perform "emergency work for the preservation of life and property to assure that individual emergency needs are met." The task would include cleaning up and removing debris, repairing and restoring public facilities, and providing technical and engineering advice to state and local agencies. In a move designed to further strengthen the Corps effort, General Clarke gave Groves responsibility for coordinating those Corps activities in New York and Pennsylvania that fell within the boundaries of other divisions. Also on 26 June, the North Atlantic Division engineer and his district engineers received authority to appoint contracting officers and let contracts. Philadelphia District had already awarded a contract on 24 June. Baltimore District's Wilkes-Barre Area Office had followed on the 26th.<sup>8</sup> While waters still inundated the area, the office in Wilkes-Barre was contacting government officials and publicly soliciting contractors. The Harrisburg Area Office divided its territory into sub-areas, placed an engineer officer from Fort Belvoir in charge of each, and had them meeting with local government officials and surveying damage in a matter of days. The aim, according to General Groves, was to be ready to go as soon as the waters receded.<sup>9</sup>

Demonstrating their desire to speed up the normal contracting process, Corps officials made contract awards remarkably fast in the weeks following. During the single week ending Wednesday, 5 July, for example, the Corps awarded 140 contracts valued at \$3.5 million for the Luzerne County effort alone. The Baltimore District's Lock Haven Area Office, whose territory encompassed the Susquehanna's west branch, where damages exceeded \$350 million, had 12 debris removal contracts underway by 5 July. Award of a dozen more was projected a few days later. Even as new contracts were being let, others neared completion. Cleanup operations in Steelton, southeast

of Harrisburg, were finished about 3 July. And a cofferdam, being erected at Forty Fort, Pa., to ease dike repairs, was 90 percent completed by 5 July.<sup>10</sup>

Debris removal consumed most of the Corps' energy in the initial emergency phase of the Agnes recovery, lasting about a month. In the Wilkes-Barre area alone, the Corps removed more than eight million cubic yards of debris. Lines of trucks, mostly civilian, contracted by the Corps, and some belonging to the Army, hauled the trash to a series of landfills established in the area. In Harrisburg, the Corps calculated daily debris removal expenditures at \$60,000.<sup>11</sup>

Some special problems were encountered in the rescue operation. Traffic was one. When city officials restricted access to Wilkes-Barre and declared martial law, the Corps helped by hiring two bus firms to provide residents with free transportation.<sup>12</sup>

Another problem was water trapped in low spots on the land side of levees. "We pumped from impounded areas to existing storm drains, pumped from impounded areas to the river and tributaries, and ditched to allow proper run-off," recalled Captain Donald F. McCullough of the Wilkes-Barre Area Office. "When we exhausted the local supply of pumps, we went as far away as necessary to get the needed equipment."<sup>13</sup>

Other formal mission assignments given to the Corps by OEP during the first weeks of the relief effort included making damage surveys to determine eligibility under Public Law 91-606, assisting in the project application program, obtaining and installing Bailey bridges, and making temporary repairs to housing units. The project application assignment, not a traditional one for the Corps, included providing technical and administrative assistance, performing inspections and audits, and making reimbursements for eligible work on applications of \$50,000 or less. Between 4 and 8 July, the Corps began construction of seven temporary Bailey bridges. Two of them were completed during the same time period.

The temporary housing repair program known as mini-repair actually started after formation of the Susquehanna Engineer

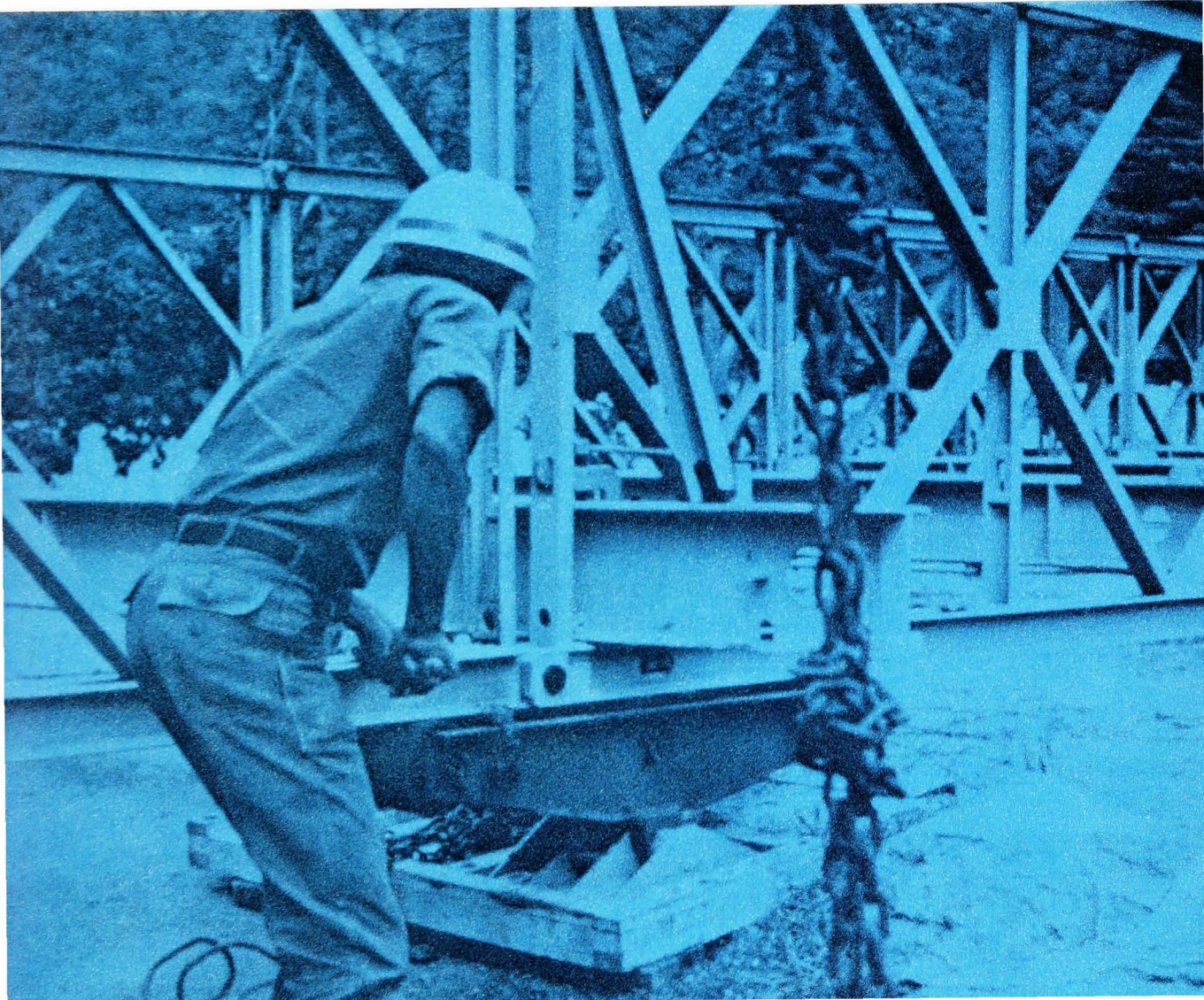


District, and accordingly will be discussed below. On 5 July, the North Atlantic Division engineer entered into an agreement with the Commonwealth of Pennsylvania for the development of mobile home group sites. The hope was to move residents of the disaster area from emergency shelters, where the effects of close quarters were beginning to tell, and place them in more suitable quarters. Work on two sites in Luzerne County began that same day; others followed a short time later.

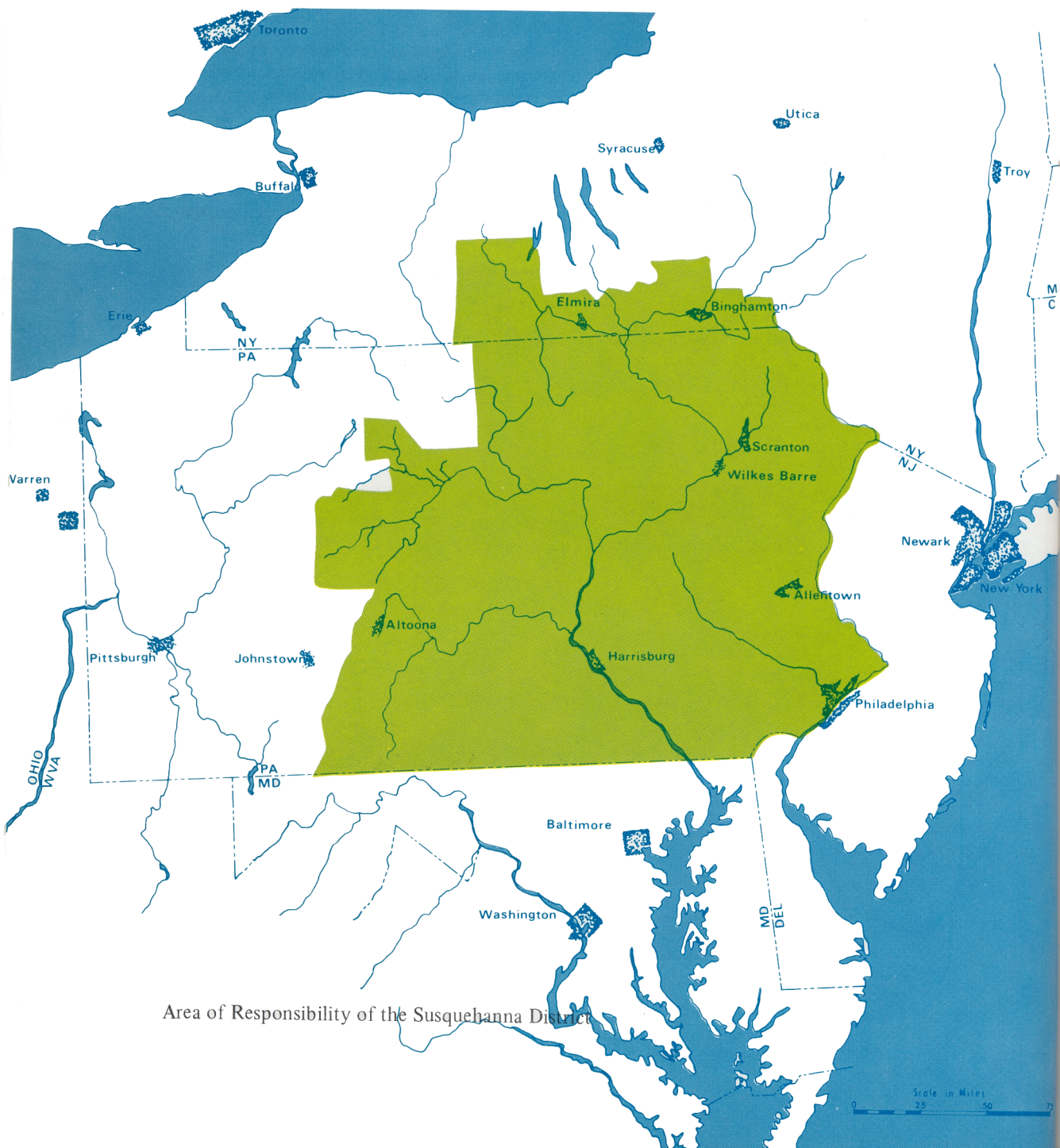
In July it became increasingly clear that the scope of work involved in cleaning up and recovering from Agnes would be tremendous. Damage estimates were being revised upward almost daily. Two weeks after the flood

thousands were still homeless in the Wilkes-Barre area while other thousands stayed on in damaged dwellings trying to clean up. The tiny village of Shickshinny, a few miles downstream from Wilkes-Barre, remained in virtual isolation.

Government agencies were plagued by staff shortages in light of the heavy demand for services. Individual frustrations mounted. Though the relief agencies could point with pride to emergency recovery accomplishments, much remained to be done. It was in this atmosphere that officials of the U.S. Army Corps of Engineers began to think of new ways to continue fulfilling their mission effectively.







Area of Responsibility of the Susquehanna District

## Chapter II - A New Engineer District Is Formed

No ordinary domestic disaster, Tropical Storm Agnes stretched the capacity of emergency relief structures at all levels to the fullest. There was not just the problem of the damage itself, there was the problem of how best to cope with it. Many of the state and local governments in the areas affected were simply unable to fulfill even minimum requirements of a recovery effort. Their emergency plans were in varying degrees of readiness, their leaders were often uninformed or inexperienced and their monetary resources were scarce. Of course some areas responded admirably, demonstrating unbelievable vitality in the face of overwhelming odds, but even they needed help.

Quick, full, effective response was a problem at the federal level as well. There, again, the magnitude of Agnes' damage was the determining factor. The Department of Housing and Urban Development (HUD), for example, had met temporary housing requirements before, but never had the number of units required been so high. The U.S. Army Corps of Engineers had much experience removing debris, but this time the debris was massive. The Engineers would be asked to do much more in the way of recovery, while regular Corps construction projects continued. Bureaucratic delay was inevitable, particularly at the federal level. With varying degrees of success, most agencies attempted to deal with such delay and with the overall problem of how best to help the people.

The Corps of Engineers met the growing

challenge of the Agnes recovery effort by putting together a new administrative creature – the Susquehanna Engineer District (SED) – to deal solely with work under Public Law 91-606 in Pennsylvania and New York. The idea originated with General Richard H. Groves, division engineer of the North Atlantic Division, near the end of June. Several factors convinced Groves that some action had to be taken within the Corps itself.<sup>1</sup> As the Corps of Engineers handled missions assigned by the Office of Emergency Preparedness in the first days after Agnes hit, Groves, in whose division most of the storm's destruction was located, observed the heavy burden placed on the division and on individual districts, particularly the Baltimore District. Prime considerations in evaluating how effectively the Engineers could continue to fulfill their Agnes mission were not only the amount of disaster-related work but also the Corps' existing workload. How much responsibility OEP would assign the Corps was unclear and the existing workload was substantial. For example, Baltimore District, the district most devastated by Agnes, had the extremely high Congressional interest job of building a new complex for Walter Reed Army Hospital, a contract exceeding \$100 million. Moreover, it was the end of a fiscal year, "the most traumatic time that one has in a district."<sup>2</sup> From the point of view of the Baltimore District Engineer, Agnes could not have come at a worse time.

Believing the workload from Agnes justified



a new district, Groves got approval from General Frederick J. Clarke, Chief of Engineers, to go ahead.<sup>3</sup> Groves had dealt with emergencies in the past, and, according to NAD Deputy Engineer Richard J. Hesse:

It was his repeated observation . . . that there's a great tendency . . . to go on forever. People will make a career of one emergency if you will permit them to.<sup>4</sup>

Groves' emphasis, therefore, was to define the problem, mobilize the resources, accomplish the mission and extricate those under his command as soon as possible in order to concentrate on his division's normal workload again.

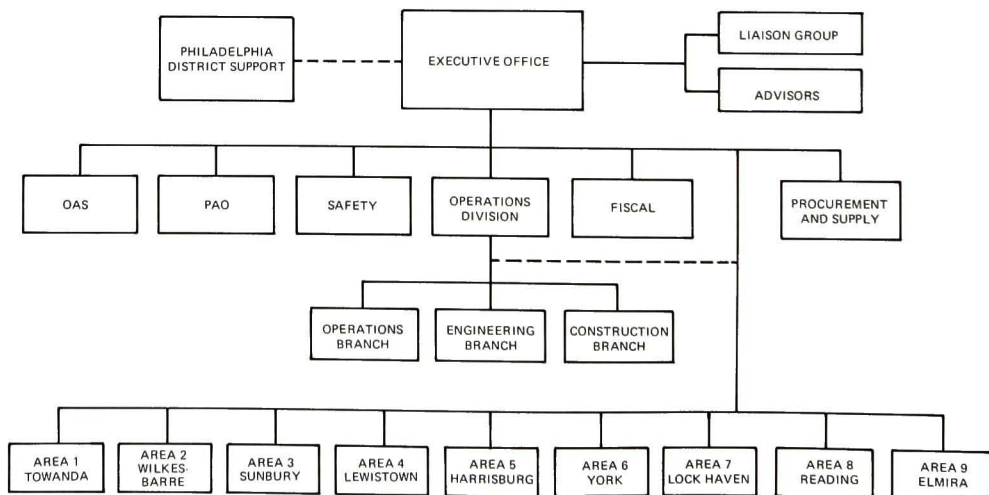
Discussions on the shape of the new organization were held between Groves; Hesse; Major General J. W. Morris, director of the Directorate of Civil Works in the Office of the Chief of Engineers; the North Atlantic Division comptroller, and others. From these meetings emerged a draft structure for the Susquehanna District. It was returned to NAD for finalization on 13 July, after review by the Directorate of Civil Works. Though Groves and other officials at NAD had envisioned a temporary district, Civil Works felt some of the staff levels put forward in the initial proposal too high.

"Planning liaison" and "program development" branches seemed unnecessary, and Civil Works recommended that personnel and data processing functions could be satellited to existing districts.<sup>5</sup>

On 14 July, while the North Atlantic Division reworked the Susquehanna District organization, the Chief of Engineers issued General Order No. 19, establishing the U.S. Army Engineer District, Susquehanna, effective 17 July. That same day NAD issued General Order No. 14, directing the Susquehanna District engineer to "perform all missions assigned under Public Law 91-606 in connection with . . . Agnes Recovery Operations and such other missions as may be assigned by NAD or OEP." Anticipated mission assignments fell in the categories of emergency work, inspection work, permanent restoration and coordination with other agencies.

Susquehanna District's boundaries enveloped the Schuylkill and Susquehanna River basins and included territory normally within the civil works boundaries of the Baltimore, Philadelphia and New York Districts. Its headquarters were placed in Harrisburg, Pennsylvania's state capital, to facilitate Corps of Engineers' coordination with and response to OEP and other federal and state agencies. Based on information available the second week in July, the Corps estimated that just under \$50

ORGANIZATION OF SUSQUEHANNA DISTRICT



million of work would be handled by Susquehanna District by 1 October.<sup>6</sup>

The decision had already been made by 13 July that Colonel John F. McElhenny, deputy director of postal construction in the Office of the Chief of Engineers in Washington, would be Susquehanna District engineer.<sup>7</sup> McElhenny was an admirable choice. His service with the Corps had begun during World War II and, in the ensuing years, had included positions as district engineer of the Jacksonville (Fla.) District and as commander of engineer troop units in Europe, Korea and Vietnam. McElhenny had had some disaster experience while serving with the Omaha Engineer District in the mid-1950's and the Jacksonville District in the 1960's. Division Engineer Groves, who had known and worked with McElhenny before, believed he had been given a "wonderful leader" and a "very fine officer." After conducting a day-long briefing for McElhenny, Groves never had to remind him of his responsibilities again. "He just took it from there," the division engineer recalled.<sup>8</sup>

General Groves officially announced the formation of the new Susquehanna District at Harrisburg on 17 July and introduced McElhenny to Pennsylvania Governor Milton J. Schapp. During the next few days, the administrative transition from the Baltimore District to the Susquehanna District was carried out smoothly while work on Corps mission assignments continued virtually uninterrupted.

NAD submitted its final organization proposal and mission statement on the 19th, the job of staffing the new district proceeded, and the General Services Administration made arrangements on 24 July to house the district office in the U.S. Steel Corporation Building in Shiremanstown, Pa., a few miles west of the state capital.

On 20 July, the Chief of Engineers and his deputy, General Groves, Colonel Prentiss and others were briefed on the Susquehanna District mission and toured Harrisburg, Wilkes-Barre and Elmira. It was the first of several visits made to SED by officials from NAD and the Chief's Office.

OEP Director George A. Lincoln lauded the establishment of the Susquehanna District as a

means of making "the Corps even more effective in its flood recovery activities."<sup>9</sup> Baltimore District Engineer Prentiss, whose organization had been dealing with the bulk of the relief effort now being placed under Susquehanna District, still felt capable of handling the whole job. Only later did he view the new district as "the best thing to happen" because it allowed Baltimore to devote more time to other long-term projects.<sup>10</sup> Groves had recognized that the move to establish SED might be a blow to the pride of the Baltimore District. He thought Baltimore was doing a good job, but "they weren't doing some of the other things they were supposed to be doing." Groves did not want to pay so high a price when he could get another organization to do the job.<sup>11</sup> Now he had it.

Trying to put together a district operation in only a matter of days presented a tremendous logistical challenge. First, office space had to be found; then, furniture, office machines and telephones installed; and finally, personnel located and transported to the district. And all of these demands arose as the Engineers recovery effort continued to expand.

While a lease for the district headquarters was being finalized, district employees already on the scene set up their temporary operations center in a conference room of a nearby motel. Other elements of the district shared office space with the Harrisburg Area Office. On 26 July furniture arrived from Philadelphia. First priority was establishing the Susquehanna District Operations Center. Eleven two-man telephone crews worked long hours to ready the vital communication lines. By the early morning hours of 1 August, the center was a going concern.

As noted, Susquehanna District's structure was modified from the normal district organization in recognition of the district's temporary status. It was heavy on technical people and dependent on other districts for administrative support. Recognizing that the Philadelphia District had "a number of key people who were very capable," had fairly recent experience with disasters, and was both sizable enough and close enough, NAD asked Philadelphia to provide legal, personnel, contract, procurement and



supply, administrative services and data processing assistance to SED.<sup>12</sup> Philadelphia District responded enthusiastically though the task was demanding.

General Order 14 establishing the Susquehanna District made the district engineer "responsible for establishing and maintaining for all elements of the Corps of Engineers a single point of contact with the State and Federal Agencies involved in disaster relief activities within his area." The district engineer had to divide his time between the district and area offices; and, because of the extensive damage in Luzerne County, he spent considerable time visiting projects managed by the Wilkes-Barre Area Office. Coordination with top government officials and briefings for Corps of Engineers superiors, which meant a heavy schedule of meetings and travel, constituted a major part of Colonel McElhenny's job. McElhenny estimated that when work was at its busiest he had as many as three telephone conversations a day plus two visits a week with the North Atlantic Division engineer alone.<sup>13</sup>

The district engineer got contracting authority for all contracts over \$500,000 and special authority to designate contracting officers, a power usually reserved for the Chief of Engineers. Where negotiated contracts were used — as they often were for mobile home site construction and temporary house repairs — McElhenny, as contracting officer, became heavily involved in the lengthy process of defining contract terms. "It was a great pleasure . . .," recalled Mary Wilson, chief of procurement and supply with the Philadelphia District, "because you didn't have to go back and tell him why you did everything. He knew because he was there."<sup>14</sup>

In the Susquehanna District Executive Office, McElhenny was assisted by Lieutenant Colonel William D. Horton of the Albuquerque District and Al Newbern as deputy district engineer and executive assistant, respectively. Horton's major responsibility was to keep the district and area office staffs functioning smoothly. McElhenny specifically requested Newbern, who had been his executive assistant at Jacksonville District, because of his contract expertise. Flo Biehm, another veteran of the

Jacksonville District, was brought in as chief contract negotiator. Charles Flachbarth of Philadelphia District's legal department served as legal counsel for the Susquehanna District, spending much time on legal details of contract negotiation. The district engineer rightly recognized that contract administration would continue to be one of his major problem areas.

Crucial to the overall operation of Susquehanna District was the liaison section. The section was responsible for coordinating all Corps of Engineers activities with OEP and the other federal and state agencies involved in the recovery effort. Susquehanna's liaison section evolved naturally from the organization established in Harrisburg by the Baltimore District when Agnes first hit. Lieutenant Colonel Charles E. Eastburn, deputy district engineer in Charleston, S.C., was brought in to direct liaison activities for the new district. He was assisted by a captain. A civilian representative from Pittsburgh District joined them to coordinate activities between the two districts and with the single OEP organization in Pennsylvania. Liaison with OEP's New York State office was carried on directly by the district engineer and the Elmira area engineer.

The liaison section became a central clearing-house for information about the district's activities. Ringing telephones were a constant fact of life. "Anybody that had a question," Eastburn recollected, "... didn't call the district. They called the liaison officer."<sup>15</sup> Indeed, considerable time was spent handling inquiries involving areas where the Corps lacked responsibility. At one point, for example, a federal agency referred persons calling it with questions about its own programs to the Corps of Engineers for the answers! As Eastburn recalled, victims and agencies "found very quickly that if any particular problem came up, they would get the fastest response from the Corps."<sup>16</sup> At the state level, a major source of inquiries to the liaison section was the Governor's Flood Action Committee, a group running a toll-free hot line for flood victims. Still, handling such calls enabled the section to fulfill an important function: it acted as a screen for other offices in the district.

The liaison officer not only spent hours on



the phone; he spent hours in meetings with OEP and with officials from the governor's office and other agencies. Many meetings occurred regularly each day or week. Others were called without notice. But whenever they were held, the Engineers' liaison officer, at the very least, was expected to attend.

Overall the liaison section's most critical activities were its contacts with the Office of Emergency Preparedness. And those contacts were made easier and more effective by the personal relationship that developed between OEP's Director of Public Assistance Joe Winkle and SED's Eastburn. "Joe Winkle and I were closer than any other two people up there," Eastburn emphasized. "We had confidence and trust in each other." That rapport was especially helpful when it came to OEP tasking of the Corps, where initial discussions often involved a verbal agreement. Eastburn felt he could reach an understanding with Winkle over a cup of coffee any time and know that it would be good.<sup>17</sup>

The second week in August, the Susquehanna District's liaison section underwent a major change. At that time President Nixon named Frank Carlucci, an official in the Office of Management and Budget and a Wilkes-Barre native, to be his personal representative in the Wyoming Valley. Carlucci was ordered to coordinate all federal activity in the area, a move designed to cut through existing bureaucratic red tape. On the 16th, OEP moved its Pennsylvania headquarters from Harrisburg to Wilkes-Barre to be nearer Carlucci. SED decided to split its liaison section in response to these developments and named Lieutenant Colonel Russell A. Hewitt, deputy engineer in the Fort Worth (Texas) District, to the new position of Wilkes-Barre liaison officer.

Susquehanna District continued to maintain a liaison section in Harrisburg, rather than move the whole operation to Wilkes-Barre. The reason for this, in Colonel Eastburn's words, was that "my contacts were more with Joe Winkle than others, and with the state."<sup>18</sup> From that point on, the Harrisburg section handled all liaison outside Luzerne County.

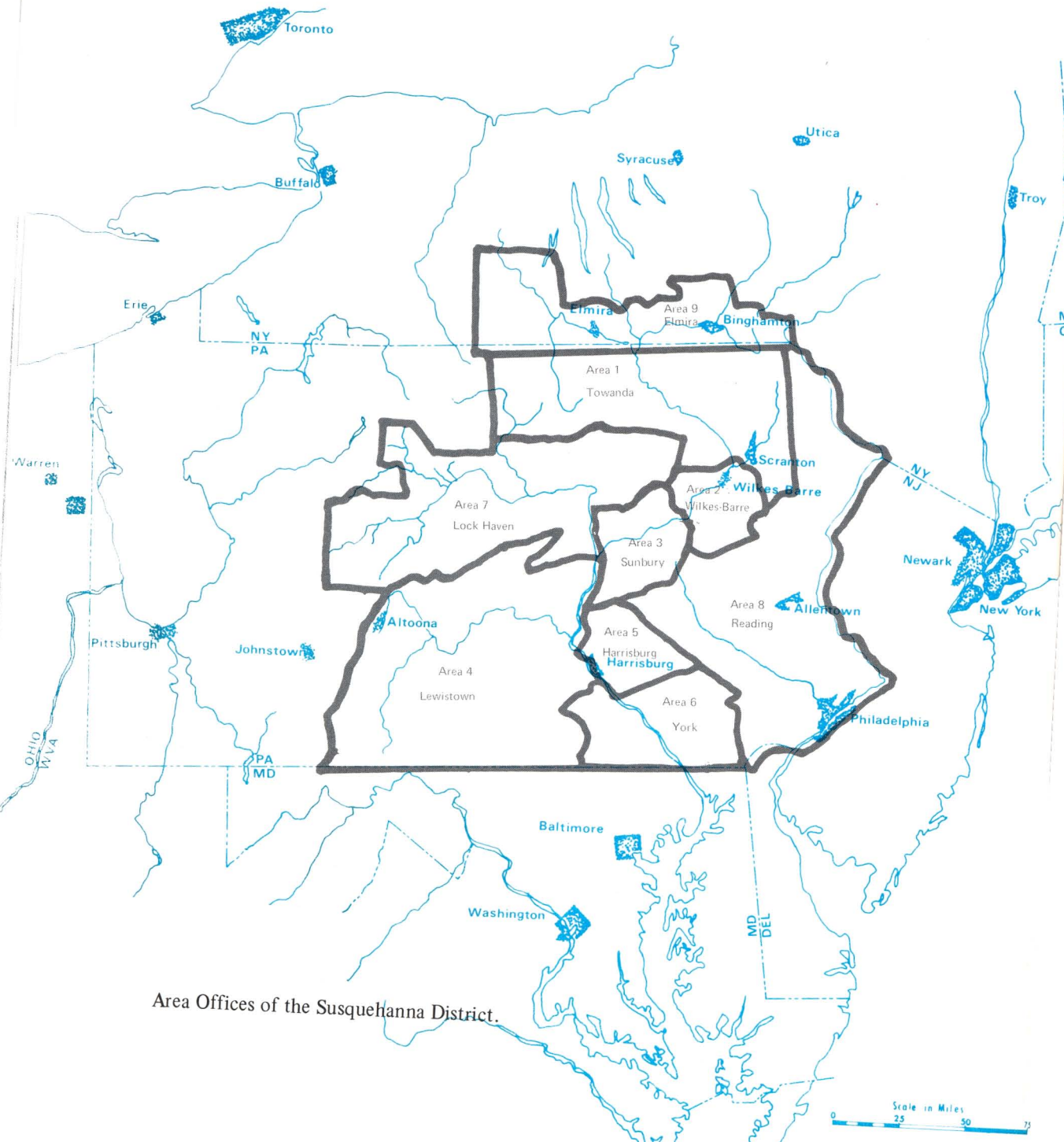
Unlike the typical district organization, Susquehanna District had an operations division

comprising operations, construction and engineering branches, an arrangement the district engineer felt best tailored to his mission.<sup>19</sup> Lieutenant Colonel Christ F. Potamos, stationed with the Sacramento District as deputy district engineer, and at the time actually involved in fighting a flood in California, got control of this crucial arm of SED.

The operations branch was actually the district emergency operations center — the district "war room." It was the clearing-house for all reports from the field on Corps activities and maintained around-the-clock telephone and telecopier contact with the district's area offices, with the emergency operations centers in other districts and in higher headquarters. Following the pattern adopted earlier in the Baltimore District, Susquehanna's Operations Officer Major Thomas Reed Bennett was assisted by an area coordinator for each area office and by coordinators for Bailey bridges, mobile home sites and personnel. As operations officer, Bennett was responsible for giving periodic briefings at the district engineer's staff meetings.<sup>20</sup>

Emergency operations center personnel spent a great deal of time preparing progress reports to keep all elements in the Corps abreast of SED's mission status. So heavy was the workload by 1 August that another major, Bernard Jacang of the Louisville District, was brought in to assist Bennett. Captain Boyd Ashcraft was utilized to coordinate Bailey bridge activities and aircraft support with the U.S. First Army.

The operations division's other two branches, engineering and construction, also played major roles in district activity. Civilian engineer William Eng, the operations division deputy director, supervised these branches. Engineering was responsible for formulating or reviewing plans and specifications for projects involving the Corps, though much of this type of work was let to private architect-engineering firms. The branch's high-level civilian engineers provided SED area offices with considerable technical advice. Once a contract was awarded, supervision was transferred to the construction branch, charged with seeing that plans and specifications were followed. Inspection was a major activity of the construction branch.



Area Offices of the Susquehanna District.



Susquehanna District's public affairs, administrative services and safety offices were manned by fewer personnel though their contributions to the district's success were nonetheless essential. SED placed a disbursing officer within its small fiscal office, a move that district officials felt essential to gaining the trust and confidence of contractors. Another disbursing officer was stationed with the Wilkes-Barre Area Office to give even greater contract payment capability where it was most needed.

The procurement and supply branch was quickly reduced from its initially projected size because of the extensive part Philadelphia District played in that area. Mary Wilson, chief of the procurement and supply division in Philadelphia at the time, was crucial to the success of Susquehanna District operations. She had construction contracting authority up to \$500,000, except in the case of architect-engineers, where she was limited to \$25,000. That Miss Wilson had any contracting authority for architect-engineers was unusual: it was normally limited to the district engineer or his deputy.

Augmented by temporary duty personnel, Miss Wilson's staff in Philadelphia handled a substantial amount of the Susquehanna District's contract paperwork. Whenever possible Chief Wilson saved time by signing papers that otherwise would have required action by the peripatetic McElhenny. Hundreds of questions on contracting were funneled to the group in Philadelphia. "The office telecopier would start to beep around seven in the morning," Miss Wilson recalled. "I even took one home on weekends when I wasn't planning to come back into Philadelphia." According to Mary Wilson, many in the field had limited contract experience, "but they had enough sense to call when they were in trouble. We had a pretty cooperative . . . effort going, which really is all that got us through."<sup>21</sup>

The Susquehanna District's nine area offices, taken over from the New York, Philadelphia and Baltimore Districts, were the instruments in the field for accomplishing SED's mission. Recognizing that a primary aim of the district was to support the area offices, Colonel

McElhenny ordered his staff to make "prompt and vigorous response" to problems raised by the area engineers.<sup>22</sup>

Negotiation and administration of contracts, inspection of area projects, and liaison with local communities were the main concerns of an area office. All but the Wilkes-Barre Area Office comprised several counties.

Each office was headed by an area engineer, but the organization varied from place to place depending on the size of the local recovery effort. Thus the Wilkes-Barre, Harrisburg and Corning-Elmira Area Offices were largest in terms of personnel and the most complex in structure. Wilkes-Barre Area Office — which operated during July and August from the Daniel J. Flood Elementary School — at one time had a maximum personnel strength of 165, while maximum strength for the Lewistown Area Office was five and for the York Area Office, eight. In terms of personnel and organization, the office in Wilkes-Barre resembled a typical district office more than an area office. Harrisburg Area Office was unique: it was collocated with the district office and, if necessary, could draw on its employees.

The Harrisburg Area Office divided into sub-areas with a captain in charge of each. As sub-area engineer, he had \$10,000 contracting authority and could execute on-the-spot work agreements. He directed a team of estimators, inspectors, and structural, electrical and mechanical engineers. Primarily to eliminate non-productive travel time, the Towanda Area Office used project or resident offices in each of the counties under its jurisdiction. These arrangements provided good examples of the decentralization of authority and decision-making that characterized the entire Corps operation.

The area engineer was the key individual in the field office structure. Part of his duties included responsibility for overseeing all phases of the contracts under his supervision, for running an efficient office, for maintaining good public relations, and for keeping accurate records and making required reports. High-level civilian engineers or majors headed the largest area offices, while captains were more commonly found with civilians in smaller area



offices. The area engineer's contracting authority, up to \$100,000 when SED was first activated, was a measure of the responsibility placed on him.

Major Robert Cook, area engineer in Wilkes-Barre after 6 August, estimated that he spent 40 percent of his time dealing with necessary contract-associated office functions such as negotiations, signatures and contract changes. Another 40 percent of his time was spent observing project status, a most important requirement to keep informed of the constantly changing situation in the field. The final 20 percent of Cook's time was devoted to coordinating Corps of Engineers efforts with those of other federal agencies.<sup>23</sup> The work was tough. Area engineers took criticism and pressure from disaster victims, municipal and state officials, and Congressmen. Eighteen- or 20-hour days were common for the area engineer and the key people on his staff. Susquehanna District seems fortunate to have had a most competent group of men serve as area engineers.

When District Engineer McElhenny arrived in Harrisburg, the personnel needs of the area offices were one of his major concerns. Manning the district office was another. Although Susquehanna District took over existing area offices and their personnel, the temporary duty assignments of many were nearing an end. Moreover SED's initial personnel requirements were greater than the number already employed. Because the Corps' mission was continually changing, still further additions were expected. Under these conditions, to get together a workable staff at all levels of the district was a real challenge.

In a repeat of what had occurred when the Agnes disaster first struck, temporary duty personnel were brought in from all across the country to man the Susquehanna District. Typists, stenographers, engineers, draftsmen, accountants, captains, majors and colonels left their home districts and made their way by bus, car, train and plane to the district. A late night phone call often informed of departure early the next day. SED's new personnel were quickly processed, briefed and placed at their assignments, the goal being full activation at the

earliest possible moment.

Most of the civilians had volunteered for their temporary assignments. Although they could stay on when those ended, many returned home where families and back-logged work awaited them. For some, the kind of atmosphere involved — it seemed the domestic equivalent of war — was reason enough to come.

SED relied on three types of personnel — Corps of Engineers military officers, Corps civilians on temporary duty assignment and local-hires. The largest group was temporary duty civilians, but the number of local-hires rose continually as the number of civilians declined, until early October when the strength of the two groups was about equal.

A substantial number of the officers serving in the district were holdovers among the captains brought in late in June from the Engineer Officers Advanced Course at Fort Belvoir. A change in the initial group occurred at the end of July when 25 new officers were assigned to the district. Though the men in the first group were gaining valuable experience, the North Atlantic Division engineer no longer wanted them to miss classes. Completion of the advanced course was a vital step in their careers.<sup>24</sup>

Military on temporary duty, except for those from Fort Belvoir, and civilians customarily came for assignments varying from 30 to 45 days, though longer stays were not uncommon. In a move designed to relieve pressure on the districts and to tap a reservoir of proven talent, many retired Corps of Engineers personnel — both civilian and military — were recalled to serve as contract negotiators, auditors, engineers, inspectors and estimators. A special source of temporary duty personnel that greatly benefited the Susquehanna District was the Huntsville (Ala.) Division of the Corps of Engineers. A unique situation existed there: Huntsville's normal mission — ABM missile site construction — had been significantly curtailed, making available a select pool of highly qualified people. Huntsville sent an especially large contingent of engineers to the disaster area. Among the positions they held were operations division deputy director, Harrisburg and Sun-



bury area engineers, and head of the Wilkes-Barre Area Office construction section.

Under the direction of Huntsville's Jerold B. VanFaasen, the Harrisburg Area Office in particular made a deliberate effort to draw upon established contacts in the ABM program. After all, one participant recalled, it was preferable to get people whose ability and performance were known.<sup>25</sup> The result, in the Harrisburg Area Office at least, was a relatively high degree of stability and continuity.

It was Susquehanna District's policy to get men and women from local communities wherever possible. Hiring such people not only helped relieve unemployment problems growing out of the flood situation, it also allowed civilians on temporary assignment to get back home earlier and it saved money.<sup>26</sup> The overtime and per diem paid to temporary duty personnel generally exceeded pay for those hired locally. At first there was apprehension about their understanding of government and Corps procedures; but in Harrisburg, for example, a nucleus of temporary people was retained to provide continuity while the local-hire group was expanded.

Local-hires eventually filled all kinds of positions in administrative, professional and clerical categories. The district personnel liaison was impressed by the quality of engineers hired locally. District Engineer McElhenny and others voiced much praise for the local-hires utilized at all levels throughout the district.<sup>27</sup> The fact that nearly all were friends or relatives of Agnes' victims, if not victims themselves, gave the local-hires a strong impetus to make the district's mission succeed. Moreover, according to one area engineer, "an unexpected benefit was their ability to effect closer liaison between the Corps and various local officials."<sup>28</sup> In several cases the Corps profited long-term when employees picked up as local-hires during the Agnes operation stayed on afterward.

Getting personnel — whether military or civilian, temporary duty or local-hire — presented difficulties. Requests for temporary duty assignments went through the Chief's Office and from there were forwarded to Corps districts and divisions across the country. They then had to look at their own existing demands

to determine where personnel could be spared and whom they could send. Lieutenant Colonel Eastburn, SED's liaison officer, explained that his district, the Charleston District, had the lowest workload in the Southeastern Division and that other districts in that division had recently undergone personnel changes, making it difficult for them to spare manpower. That he was a lieutenant colonel and that he was available decided it. He was the man for the job.<sup>29</sup>

Philadelphia District sent Thomas Muldowney from its own personnel office to serve as personnel liaison for Susquehanna District. Muldowney helped screen personnel requests from the area offices and set about the difficult task of finding local-hires. Area office requests had to be reviewed to determine if positions were essential and had been properly classified. For example, requests might call for an engineer where a less qualified individual would suffice. Given a tight supply and the pressure of time, personnel officials acted accordingly.<sup>30</sup>

In Harrisburg Muldowney was confronted with the basic problem of identifying a pool of workers. State records of previous employees would ordinarily have helped, but they were damaged beyond use. Clerical workers are normally in short supply in a state capital, and now other federal agencies were expanding their own operations, a situation making competition for the available labor keen.

SED asked local radio and television stations and newspapers for free advertising to attract applicants. To be more competitive, pay rates were adjusted above usual entry levels. In the early days, Muldowney recruited personally in restaurants, on the streets, anywhere that he thought qualified people out of work might be found. District representatives often had to plead and cajole to convince a potential employee that working for the Corps was best. This was not the preferred way of running a personnel operation, but under the circumstances it was probably the only way. And it worked remarkably well.

• The nature of the Susquehanna District and its sources of manpower inevitably created personnel turbulence, a condition widely recognized as a problem within the district. SED

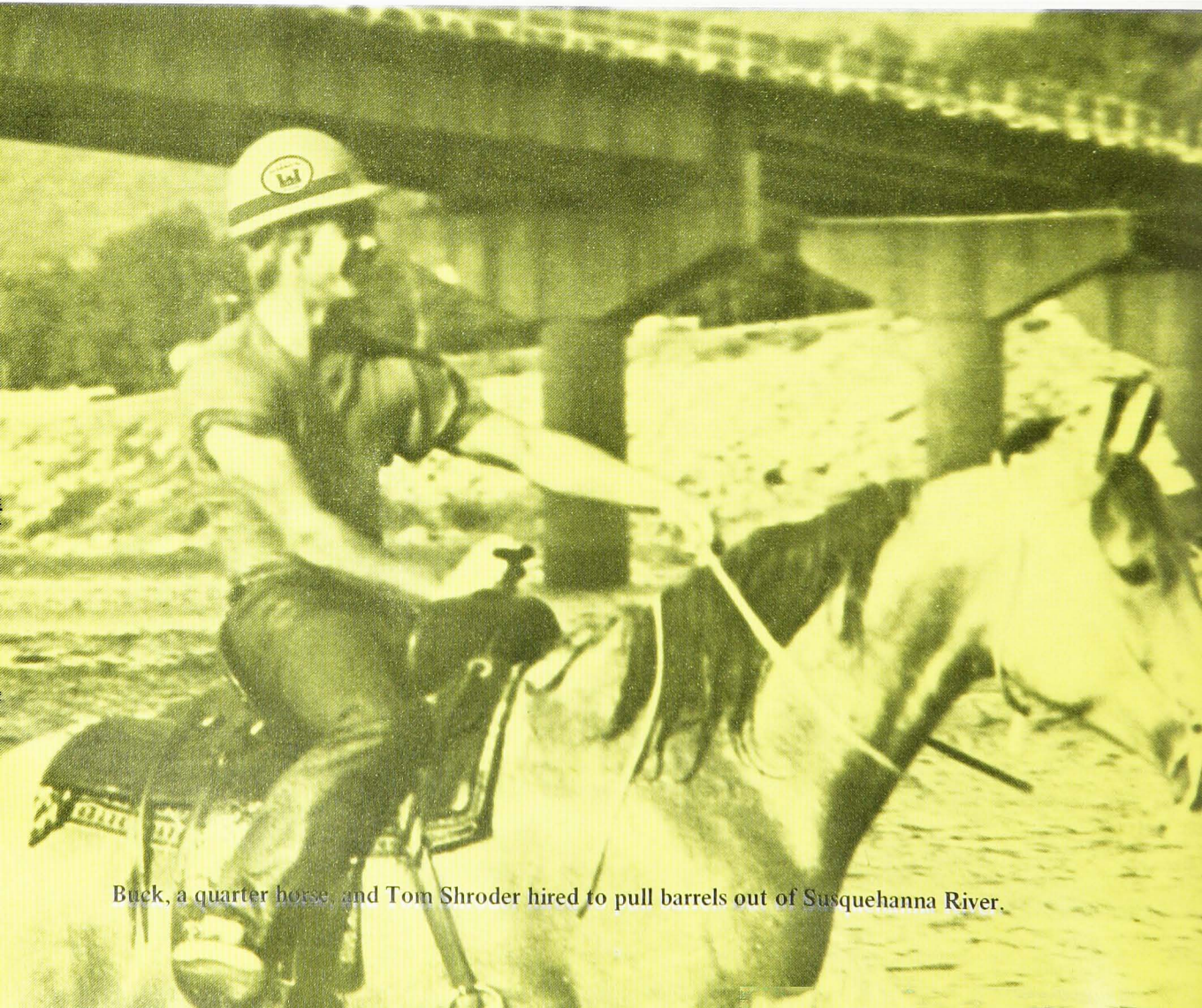


employees borrowed from other districts were continually coming and going, often with little or no overlap. This was unfortunate because so many people lacked experience with OEP's disaster procedures and because successful interaction with state and local officials generally resulted from established personal contacts. But there was another side to the problem. Disaster operations were physically draining, families needed their fathers and mothers, and home districts and divisions had ongoing missions to fulfill. For the most part these districts had sent good people to SED, and they wanted them back.

During Susquehanna District operations, some effort was made to alleviate the effects of

personnel turbulence by accelerating the use of local-hires and where possible extending temporary assignments, but the problem remained. In later assessments of the district's performance, nearly all participants noted the unsettling effects of manning a district with temporary-duty employees. But disagreement persisted on how personnel changes influenced district performance and on ways to eliminate the worst aspects of the problem.

In late July SED leaders and their superiors justifiably expressed pride in the manner in which they had put together their temporary organization. But they knew the real test would be their performance of existing and future mission assignments.



Buck, a quarter horse, and Tom Shroder hired to pull barrels out of Susquehanna River.



# Chapter III - Debris Removal, Mobile Homes and Mini-Repair

As noted earlier, two of what later became the three major Susquehanna District missions — debris removal and mobile home site construction — were underway before SED was established. The third, mini-repair, was added on 18 July, the day after SED was formed. The district's involvement in all cases was based on Office of Emergency Preparedness assignments and followed guidelines provided by OEP in its "Federal Disaster Assistance Program Manual for Applicants" (OEP Circular 4000.5C), plus several supplemental announcements. SED's area of responsibility included only work coming under Public Law 91-606, as outlined above in Chapter I.

## DEBRIS REMOVAL

Debris removal, a category of work which included clearing streets and streams and demolishing buildings, was a traditional disaster assignment for the Engineers. After Agnes, trash had accumulated in waves, reflecting the clean-up process. First, homeowners and businessmen threw out water-logged furnishings. That task was no sooner completed than the drying out process caused disaster victims to throw out floor boards, doors and other damaged structural pieces. Even further drying resulted in crumbling walls, another source of street debris.<sup>1</sup> Under these conditions, the Corps' street clean-up operations continued until the end of September when OEP reassigned the task to local municipalities, with

federal assistance provided if needed. The final SED effort in the Wyoming Valley — dubbed "Operation Clean Sweep" — occurred on 25 September.

Importantly, the overall performance of the debris removal operations depended a great deal on the cooperation of the people as well as the Corps' ability to contract and supervise the work. As Captain Calvin F. Currington, one of the officers who served as assistant area engineer in Elmira, said:

The people with damaged homes were willing to go in, pull out the debris and put it in the street for removal. Their quick response and determination helped make that part of the program a success. They took a willing and constructive attitude and then went ahead and did it.<sup>2</sup>

Collecting the vast quantities of debris left by Agnes presented the problem of where to dispose of it. In major disaster areas such as Wilkes-Barre, Harrisburg and Corning-Elmira, new landfill sites had to be utilized. There were several such sites in the Wilkes-Barre vicinity alone. Some were abandoned strip-mine pits, a fact causing considerable trouble when the Bureau of Mines and the Environmental Protection Agency (EPA) used infrared photography and located spots susceptible to spontaneous combustion.<sup>3</sup> In early August the U.S. Depart-



ment of Interior suggested removing already buried trash in the mine pits as a precautionary measure; but after study, the Corps determined that the landfills had been carefully prepared and opposed such action.<sup>4</sup> The agencies involved resolved their disagreement after a meeting on 5 September. The landfill sites would be monitored by drilling six-inch diameter wells to a depth of 25 feet.

In less populated areas, considerable debris was disposed of through controlled burning. This was the case in Pennsylvania's Schuylkill River valley, where by arrangement with EPA and the Pennsylvania Department of Environ-

mental Resources, debris was burned on several islands in the river.

Closely allied with the Corps of Engineers assignment to clear street debris was the task of demolishing buildings judged beyond economical repair and presenting a threat to public safety. Demolition was permitted only in municipalities where the Corps had already been tasked to remove debris. Local authorities, as well as state and federal officials, attested to the eligibility of the structures involved. Great care had to be taken to be sure owners signed releases approving the action and stating they would not hold the governments involved re-





sponsible for any damages resulting from the operation. Because they operated only under authority of Public Law 91-606, the Corps had to avoid removing buildings condemned as unsafe prior to the disaster or buildings scheduled to be removed as part of urban renewal.

Hoping to speed the process of demolition, OEP in late August permitted the Corps to proceed without prior approval where removal was estimated under \$25,000. Application deadlines for building demolition were twice extended to benefit disaster victims. And following the pattern of other programs, OEP

transferred responsibility for demolition to local communities as of 15 November.

In the hard-hit Wilkes-Barre area, building demolition normally kept a project engineer, four field representatives and a clerk-typist busy full time. Between 25 July and 30 November, the Wilkes-Barre Area Office administered 63 demolition contracts under which 1315 structures were razed. The entire Susquehanna District contracted for the removal of some 1500 private homes and garages at a cost of \$1.2 million.

Tropical Storm Agnes' raging floodwaters not only did great damage on land but, when





they receded, revealed extensive damage to streams and rivers. Banks were undermined, trees uprooted, and bridges washed away. Some streams were literally choked with debris while the floodwaters altered the course of others. Of great concern were hundreds of barrels, some containing dangerous material, swept into the Susquehanna River near Harrisburg and requiring special handling by the Corps. In eastern Pennsylvania, Agnes flushed nearly five million gallons of oil sediment and residue from the settling ponds of a waste oil processing plant into the Schuylkill River. The Environmental Protection Agency gave the Corps of Engineers \$1.6 million to clean it up.

The need to remove refuse from the waterways and to restore them to their pre-flood condition ultimately made stream clearance a major part of the debris removal program. Fear that more heavy rains might only worsen an already devastating situation contributed a sense of urgency, but the bulk of stream clearance work was done in September and October.

In part the delay was due to the more immediate threat presented by other types of debris. General Groves, who found stream clearance the least successful of traditional Corps missions after Agnes, assessed the situation as follows: "We gave it rather low priority. And I guess we probably always will, because the first thing you take care of, you get people under shelter, feeding them, clothing them, taking care of health hazards, and removing the immediate dangers to life and property."<sup>5</sup> From the more restricted point of view of a captain in the Sunbury Area Office, stream clearance was slowed down primarily because a long and complicated form was initially used for securing rights of entry.<sup>6</sup> The outcome, Groves concluded, was that by the time the Engineers got around to stream clearance, very real environmental problems had been generated.

The difficulty of estimating how much work was involved and a lack of equipment initially led the Susquehanna District to award stream clearance contracts on a time and equipment basis. On 15 August, however, District Engineer McElhenny ordered a change to more easily

managed lump sum supply contracting.

Contracts divided rivers and streams into reaches, with contractors instructed to remove and dispose of all debris within a specified area. Instructions given the contractor ordered him to "protect and preserve the natural condition of terrain and vegetation" and enjoined him from polluting the water.<sup>7</sup> Yet OEP generally restrained the Corps from reseeding the surrounding area, a requirement that ultimately proved quite troublesome.

Small streams, particularly in rural areas, presented unique problems. Contractors had to gain access to the damaged area, perhaps by cutting a new road. Permission was required where private property was involved. If the mass of debris to be moved was great, the contractor had no choice but to use large equipment though unwanted damage might result to the surrounding terrain. Time and a shortage of manpower and small equipment were additional factors.

In larger streams and rivers, the magnitude of the operation was usually considerable. A contractor working a 14-mile stretch of the Susquehanna River above Wilkes-Barre used log-skidding equipment, a log loader, bulldozers and payloaders and had boats tow cables into the river channel, where they were used for hauling the heaviest pieces of debris to the shoreline.<sup>8</sup> Between 1 and 13 October SED awarded five contracts in the Towanda area totaling \$790,000 for work in the Susquehanna River, three contracts totaling \$105,288 for Bowman Creek, and two contracts totaling \$111,000 for the Towanda Creek.<sup>9</sup>

SED tried to concentrate its efforts on the Susquehanna River and its major tributaries and leave the rest up to local governments. Whether or not the Corps was responsible for actually performing the stream clearance, qualification for such work under Public Law 91-606 had to be determined in advance. This was accomplished by means of the damage survey report, the OEP document required to determine eligibility and estimate damages for all programs under Public Law 91-606. Corps of Engineers area office personnel participated regularly along with state and local officials in making the surveys. Problems developed in this



area due to inadequate acceptance guidelines, misunderstanding of the program among local officials, changing cut-off dates for the program, and lack of experience among the Corps personnel involved.

Eligibility requirements for stream clearance were only broadly delineated by OEP at the outset. Consequently, damage surveyors often included work that was not intended by OEP to fall under the law. OEP clarified its position in August by providing specific examples of eligible and ineligible work, but problems continued. In one instance, for example, SED engineers felt work essential to prevent future flooding, only to have OEP declare it ineligible.<sup>10</sup> At a meeting attempting to overcome controversy surrounding damage surveys, James Lewis, OEP's deputy assistant director for disaster programs, "implied that the [Corps of Engineers] had reflected on the Damage Survey Reports that work which the [Corps of Engineers] wanted done . . . as opposed to the minimum amount of work . . . necessary to satisfy the OEP guideline requirements."<sup>11</sup>

Another challenge was to insure that stream clearance was limited to debris actually caused by Agnes. Lieutenant Colonel Christ Potamos, SED director of emergency operations, addressed this point in instructions given to officials in the Towanda Area Office:

Approach the people and be nice about it. Get a good idea of what was there. Be careful . . . There are many pieces of concrete and large rocks in some of these rivers. The first thing I say is, "That was not caused by Agnes." And if they say it was, I say "Prove it."<sup>12</sup>

In response to the city of Scranton's desire to have the Corps clean, dredge and deepen the Lackawanna River, a damage survey report was made in October 1972. The survey found 800 cubic yards of Agnes-related material but concluded that most of the debris resulted from years of inadequate maintenance.<sup>13</sup> The Susquehanna District then had to explain why it could not do all the work and recommend that

Scranton apply for assistance through other channels.

Additional difficulties stemmed from the damage survey process itself. One SED area office damage survey coordinator noted difficulties in balancing federal, state and local views while determining damage assessments.<sup>14</sup> The Sunbury Area Office lacked so simple a thing as adequate quad maps, a circumstance that later required redoing several inaccurate surveys.

In many instances, local officials failed to understand that damage survey estimates and scopes of work were subject to OEP review and might subsequently be reduced. This created controversy in instances where local communities completed stream clearance on their own and then sought reimbursement from OEP under project application provisions of Public Law 91-606. Unfortunately it was usually the case that the community had first seen the damage survey report, thought it final, and done the work, all the while assuming that everything listed on the original survey would be approved by OEP. Many communities found out what was non-reimbursable after the work was completed or well underway.

The greatest dispute involving stream clearance arose in Tioga County, Pa., which fell under the jurisdiction of the Towanda Area Office. Local citizens and county commissioners claimed that Corps inspectors had originally "indicated that bulldozer type clearing was eligible and would be reimbursed." These communities had gone ahead with work that sometimes resulted in "trapezoidal ditches rather than free flowing streams."<sup>15</sup>

In response, OEP ordered the Engineers to conduct resurveys during September. SED's engineering branch organized the project. Some 200 resurveys were conducted within three weeks. A few surveys continued to authorize dozer work, though inspectors were generally less liberal this time than their predecessors had been.<sup>16</sup> In fact, as one of the surveyors indicated, damage survey reports were usually limited to restoring streams to original channels rather than clearing debris to flood levels because the latter was felt to be impractical. An attempt was even made to underscore what



work OEP might declare ineligible.<sup>17</sup>

To ease relations with local communities further by explaining ineligible and eligible work in Tioga County, OEP requested that a special office at Wellsboro, Pa., be manned by three representatives of the Corps. That work began on 14 September. Much time was spent by officials at the district level in handling an understandably large volume of Congressional inquiries on the situation in Tioga County from Representative Joseph M. McDade of Pennsylvania's 10th District.

A further element of controversy was injected into the stream clearance mission when some members of the Pennsylvania Fish and Wildlife Commission criticized the manner in which the Corps cleaned up prize trout streams. Again, the issue centered around the use of heavy equipment. At a meeting with commission representatives on 29 August, SED Liaison Officer Eastburn vigorously defended the Engineers. Eastburn corrected the erroneous assumption that SED was responsible for and controlled all stream clearance projects. In fact he pointed out that local communities had accomplished most of these projects and politely suggested that the commission direct its efforts to them.<sup>18</sup> The two parties finally resolved their major differences through compromise.

As if guidelines, geography and local opinion were not enough, the stream clearance effort was jeopardized by the inexperience of Corps personnel assessing the damage. Colonel McElhenny felt the situation in Tioga County alone pointed up a deficiency in Corps disaster planning: not enough people were trained and qualified to do damage survey work.<sup>19</sup> Nor was the Towanda Area Office alone at fault. A civilian who served in the Sunbury Area Office felt the damage survey reports prepared by his office and the Lock Haven office "were very amateurish and as a result precipitated much criticism from OEP and local officials." Indeed, he concluded that the lack of experience by damage survey teams caused many of the most serious Congressional inquiries.<sup>20</sup> The lesson was clear: success in this important mission demanded more adequate preparation. At the same time, however, it was apparent that no

factor alone was responsible for the situation in Tioga County.

When debris removal was complete, Susquehanna District had let contracts for all types of debris totaling \$38.5 million. Of that, \$31.9 million was spent by area offices in Pennsylvania. Wilkes-Barre Area Office led the way with \$19.5 million. In New York, the Elmira Area Office expended approximately \$6.6 million on this program.

## MOBILE HOME PARK CONSTRUCTION

With thousands of people homeless in the wake of Tropical Storm Agnes — most of them in Pennsylvania's Luzerne County — temporary housing was a serious problem. At first emergency public shelters sufficed; but, for long-term community needs and individual peace of mind, other types of shelter were essential. It was not a question of staying in emergency quarters until the floodwaters receded and then returning home to clean up. Not when one's home was totally destroyed, washed from its foundations, or, at the very least, still standing but uninhabitable.

Following tradition, government turned to mobile homes to solve the housing problem. Though the Disaster Relief Act of 1970 provided for the use of "mobile homes or other readily fabricated buildings," it was clear to Pennsylvania state officials, in meetings with federal officials after Agnes, that "the mobile home was the only shelter system in the federal government's emergency disaster housing program."<sup>21</sup> The Office of Emergency Preparedness initially assigned the Department of Housing and Urban Development with the task of getting the mobile homes, establishing a system for assigning them to disaster victims, and installing them on mobile home park sites. In Pennsylvania, the Department of Community Affairs took on the responsibility of providing land for the group sites and preparing the sites. As noted in Chapter I above, the Corps of Engineers got involved on 5 July when General Groves signed an agreement with the state to prepare the mobile home sites. Pennsylvania turned to the Corps, according to officials of the Department of Community Affairs,



“because the Corps . . . [was] the only agency with the logistical capabilities to move quickly into an area and place under contract the large construction tasks needed in a disaster recovery operation.”<sup>22</sup> At this point, HUD, the Pennsylvania Department of Community Affairs and the Corps of Engineers each had a role in the mobile home program. In New York, the state rather than the Corps of Engineers handled site preparation.

With disaster victims given the alternatives of living with friends or relatives, moving to a new community, placing a mobile home on an individual site, or returning home, it was extremely difficult to estimate group site needs.

HUD projections were continually undergoing revision as the Corps’ mobile home mission proceeded. As in all other areas of what eventually became Susquehanna District missions, the majority of work centered in Luzerne County. At a meeting with OEP officials on 23 July, the district engineer agreed to construct 5000 trailer pads and design an additional 1000 pads as a contingency in Luzerne County. By 2 August, Wilkes-Barre area needs had been projected at 7250 mobile home pads; on the 6th, the total requirement for temporary housing of all kinds in Luzerne County was set at 13,500 units.

From the start, emphasis was placed on





completing site construction as fast as possible. People needed the housing and an early winter was feared. OEP Director George A. Lincoln set the pace on 12 July when he said there would be 5000 pads completed by the end of August.<sup>23</sup> OEP wanted all temporary housing placements made by 15 September.

General Groves told SED officials that North Atlantic Division and Susquehanna District "would stand or fall on whether we make that target."<sup>24</sup> Though the statement was probably an exaggeration, it indicated the priority attached to the mission. SED was required to make daily progress reports to the Chief's Office and NAD on the status of mobile home site construction and the number of pads turned over to HUD for actual placement of trailers.

In the early stages of the program, scenes of angry flood victims besieging government offices and officials with inquiries about delays in getting housing were common. Difficulties obtaining trailer site approval and moving trailers to the disaster area, combined with some administrative blunders, largely accounted for the flood victims' frustrations. Split responsibilities within the group site program added another dimension to the problem.

Geography presented difficulties at several sites supervised by the Wilkes-Barre Area Office. "Extensive quantities of rock were encountered on four sites, high water table was encountered on two others and previous landfill operations left another site unstable."<sup>25</sup> At Coal Brook, the latter site, concern over the presence of methane gas led to the use of ventilation tubes to prevent explosion. A one-to three-week lag between site completion and occupancy, due to delays in delivery and hook-up of units, at times jeopardized the program.

The Susquehanna District inevitably fell behind in its ambitious schedule, particularly in Luzerne County; but in the long run it hardly seemed to matter. On 5 September, for example, the district reported slippage on its completion dates while noting that HUD was having difficulty finding families to move into already finished units. The occupancy rate on some completed sites was only 40 percent. A

488-unit site planned in early August for Wilkes-Barre's Hollenback Park, a municipal golf course, was dropped on 8 September because of the reduced need for mobile homes in the area. A site under design for the Sunbury Area Office was later eliminated for the same reason. HUD even began to rent some mobile homes to contractors to house their personnel. On 14 September HUD revealed that three sites (721 pads) then under construction in Luzerne County were to be reclassified as "standby sites" for use only if additional mobile homes were needed. One of these sites, Valley View, cost \$991,000 to complete. Reasons given for the initial demand for trailers in group sites falling short include the establishment of individual sites, the use of travel trailers, the temporary repair program, and public displeasure with sites located in remote areas.<sup>26</sup>

The Corps of Engineers mobile home mission included responsibility for design which was contracted to local architect-engineering firms. They generally were asked to complete the design in a matter of days, a real challenge given the variety of areas proposed as group sites. According to an official in the Harrisburg Area Office, the designers, having been instructed to avoid creating "instant ghettos," set trailers at angles and planned curving roads to give "the feeling of suburbia instead of temporary construction."<sup>27</sup>

Mobile-home site contracts managed by the Susquehanna District initially provided for site preparation and distribution of water, electricity and sewage facilities. The mission was subsequently broadened. On 27 July, Chief Engineer Frederick J. Clarke announced that the Corps had been tasked to take over utility hook-up from HUD on group sites in Luzerne County. Although the order was rescinded three days later, the Corps remained ready to help if necessary. In fact General Groves instructed SED to provide whatever assistance HUD requested with its part of the trailer program.<sup>28</sup>

On 15 September, OEP tasked the Engineers to design a natural gas pipeline for the 180-pad Harvey Roer project in Luzerne County, as well as natural gas systems utilizing bulk propane for other group sites. The Corps accepted responsi-



bility for gas hook-ups at Harvey Roer on 2 October after the proposal had been offered and withdrawn, offered again and declined, and offered a third time, all within three days.<sup>29</sup>

Susquehanna District took on another responsibility when on 24 September District Engineer McElhenny entered into a letter agreement with the Pennsylvania Department of Community Affairs to contract for the installation of package sewage-treatment plants at mobile home sites too distant from existing sewage facilities. In fulfilling its mobile home assignment, the Corps was acting as contracting agent and manager for a significant phase of the federal disaster relief program. A major was placed in Harrisburg to serve as overall coordinator for mobile home site construction. It was district practice to assign an engineer officer as project engineer for each of the larger sites or several smaller sites.

Inspectors, whose job it was to assure contract compliance, coordinate changes, keep the contractor on schedule, maintain safety standards and document progress and problems, were as always a key to successful Corps performance. Captains from the Engineer Officers Advanced Course at Fort Belvoir and civilians on temporary duty or local-hire engineers performed these tasks.

The first and major phase of Susquehanna District's mobile home park construction mission was officially completed on 26 September when 6758 pads were reported finished on 62 sites statewide. Of those, 5456 pads were located on 29 sites in Luzerne County.

Until September, SED's involvement with mobile homes was limited to group sites; but on 1 September it was agreed, during the course of the daily staff meeting of Presidential Representative Frank A. Carlucci, that Susquehanna District would provide natural gas hook-ups to trailers on individual sites in the Wyoming Valley area. The need for such action was clear: as of 28 August HUD had placed 3500 trailers on individual sites but only 200 had received gas connections. The demand simply exceeded the capabilities of local contractors utilized by HUD.<sup>30</sup>

The designated contractor was Morrison-

Knudsen of Boise, Idaho, a firm soon to be heavily involved in the district's mini-repair program. Colonel McElhenny and his executive assistant met personally on 1 September with representatives of Morrison-Knudsen to work out details of a letter contract. The contract which called for the installation of natural gas to approximately 1000 individual trailers was awarded two days later.<sup>31</sup> McElhenny assigned Major James A. Brueggeman of the Missouri River Division to serve as contracting officer representative for this project.

The Morrison-Knudsen assignment involved excavating trenches to carry gas lines to individual trailer sites. The company organized their workers into nine-man teams giving them a capability of digging some 200 trenches per day. By 19 September, HUD had identified approximately 950 units for hook-up. On the 22nd, SED exercised the government's option and added another 1000 units to the contract.

Under the federal government's temporary housing program, trailers had been placed on lots alongside damaged homes or on other sites designated by the applicant. This presented some logistical problems. The task was complicated further by administrative errors: duplication on lists of trailers, assignment for gas hook-up of trailers actually set up to receive electricity or use oil heat, and assignment of trailers that didn't exist.<sup>32</sup>

The contractor was also delayed beyond the initial 30 September completion date by a special assignment at one of the group sites and by the added task of making conversions from liquid to propane gas. Morrison-Knudsen completed its work in mid-October, after connecting 1194 trailers at a unit cost of \$357.

The Corps' mission to develop group mobile home sites entered Phase II at the beginning of October. Divided into two parts, this phase included paving roads, putting in sidewalks, providing mail boxes and trash can holders, seeding, correcting drainage problems, and erecting prefabricated buildings and air-supported recreational facilities. Phase II construction was completed by 23 November. The plan to utilize air bubbles was ultimately scrapped because bids received for the work far exceeded government estimates.<sup>33</sup>



Support of HUD in the mobile home program for a time included performing necessary repairs to individual units. The Wilkes-Barre area engineer, Major Robert Cook, recommended assembling a team of Air Force engineers under control of his office to complete the work. A total of 41 men from Air Force "Red Horse" and "Prime Beef" units arrived in Wilkes-Barre between 23 and 30 August. By 25 October they had completed repairs to 1904 mobile homes on individual sites and 1533 on Corps-constructed group sites. The exercise was one more example of valuable support given the Corps by other military units.

Only four months after the Corps of Engineers completed construction of group site pads, William Wilcox, secretary of the Pennsylvania Department of Community Affairs, reached a sad conclusion. The experience in Pennsylvania after Agnes, in Wilcox's view, represented the "waterloo of the mobile home as far as using it for temporary housing in a major disaster."<sup>34</sup> His department estimated that the federal government had wasted \$10 million in the Wilkes-Barre area where only about 50 percent of the pads prepared by the Corps of Engineers were ever occupied by flood victims.<sup>35</sup> In fact, Pennsylvanians preferred individual trailer sites over group sites by a margin of nearly two to one.<sup>36</sup>

These assessments, however, gave SED officials little reason to feel their performance lacking. The attitude expressed by Secretary Wilcox and echoed by others actually reflected exasperation with the red tape involved, the difficulty in acquiring, transporting, and distributing mobile homes, the condition of the homes upon arrival and the public's preference for other housing. Amid such considerations, hardly a complaint was registered relating to the Corps' role in the mission.

Compared with the overall rate of completion on temporary housing units after Hurricane Camille in 1969, the record for all areas affected by Agnes was little short of phenomenal. More units were provided in a six-week period in 1972 than in a six-month period in 1969, and Susquehanna District clearly helped establish that record.

## MINI-REPAIR

The federal government undertook a unique program after Agnes that was designed to allow flood victims to move back in to their flood-damaged homes. The program, aptly named "mini-repair," envisioned minimal repairs below the second floor of eligible homes. The aim was to restore essential utilities, safety and security, and thereby to bolster the spirit of flood victims and stabilize badly damaged neighborhoods.

Because of the temporary nature of the program, repair costs on individual dwellings were limited to \$3000. For any group of homes, repairs were expected to average \$1500.



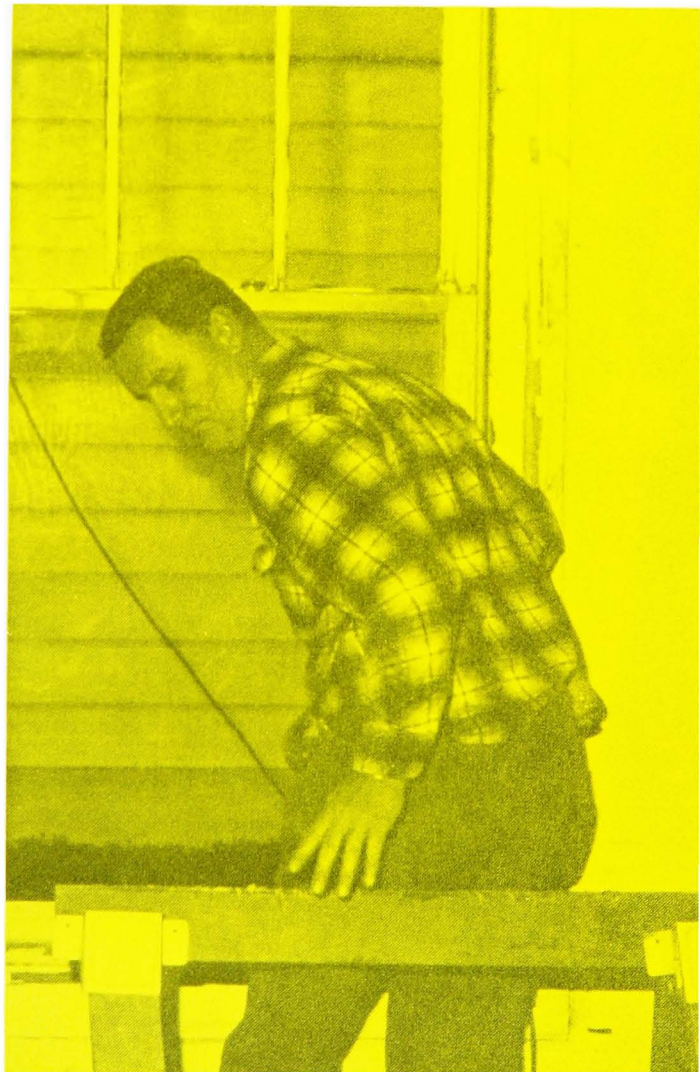


Mini-repair aimed at housing people fast. The process from damage estimate to award of contract and start of work was completed in five days, and contractors were given two weeks to complete the repairs. To further speed the program, houses were initially contracted in packages of five in order to involve small local contractors in the repairs.

Disaster victims were expected to carry out total rehabilitation with loans obtained from the Small Business Administration or other sources. Once again, the Office of Emergency Preparedness turned to the Corps of Engineers to implement the major part of the program. The task was assigned to the Engineers on 18 July, almost simultaneously with the activation

of the Susquehanna District.

In Pennsylvania, OEP focused mini-repair on Luzerne and Dauphin Counties (comprising the cities of Wilkes-Barre and Harrisburg), and in New York, on the Corning-Elmira area. HUD was responsible for identifying houses eligible for the program; the Corps of Engineers made damage estimates, established a scope of work, contracted for repairs and conducted inspections. Eligible work included repairs to plumbing, electrical, heating and hot water systems; outside doors and windows, broken stairs and buckled floors; and steam cleaning and extermination. Painting, wallpapering, plastering, air-conditioning repairs, replacement of appliances, and work on ceilings and interior



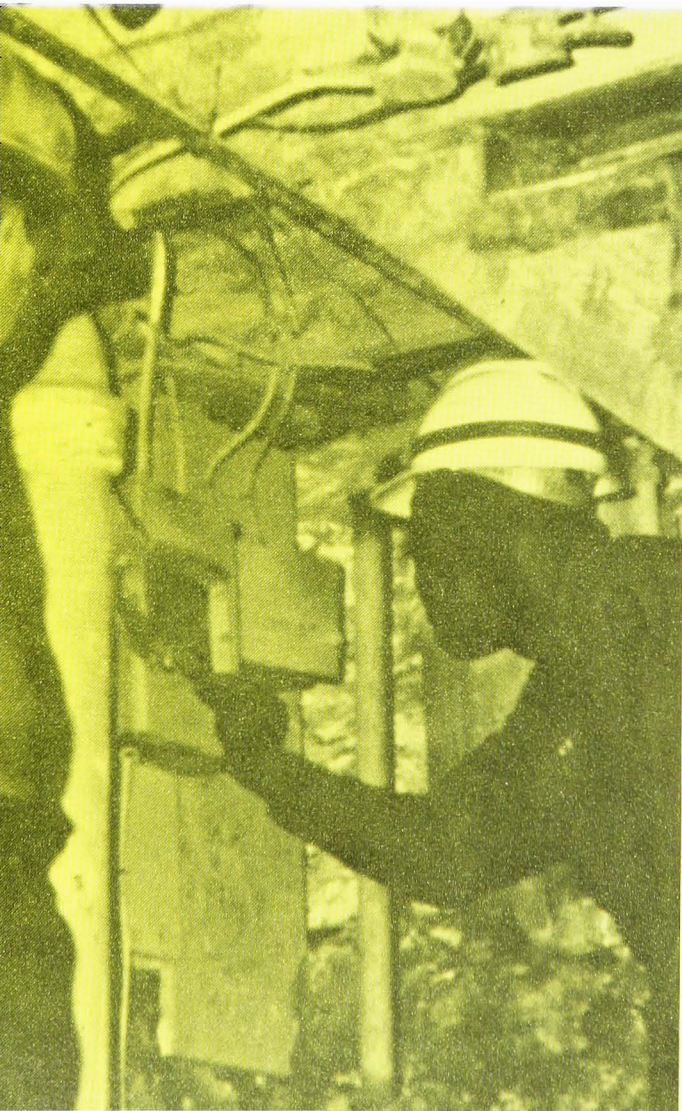


walls and floors, except when unsafe, were excluded.

Estimation and inspection engaged a large number of people during the height of the program. So much work was involved for the Wilkes-Barre Area Office by the end of August — 793 homes had been determined eligible and 571 were under contract — that more than 140 personnel were directly involved. At this point Wilkes-Barre's mini-repair staff itself resembled a large Corps of Engineers resident office. When the program first started in Wilkes-Barre, there was only a small staff headed by an Army captain. The Corps relied heavily on local architect-engineers and on non-commissioned officers from Air Force "Red Horse" construc-

tion units and active U.S. Army construction battalions for its estimators and inspectors.

Being an untried project in a disaster situation, the mini-repair program underwent changes and presented new problems as work progressed. Thus, on 26 August, Presidential Representative Frank Carlucci directed the Corps to begin including first floor wall insulation in mini-repair contracts where needed. The change came partly as a result of concern over lack of insulation voiced by the Chief of Engineers after a visit to mini-repair sites.<sup>37</sup> Insulation had been torn out and thrown away because of wetting in some 40 percent of the homes under repair. A harsh winter, it was feared, could again make them unlivable.





Experience with the program also resulted in a revised completion date — 31 October rather than 30 September. Uncertainty as to the scope of the program was a constant concern of the Corps as it was in most areas of disaster relief. Efficient performance required a feeling for where the program was going, particularly for how many units were expected to be repaired. Susquehanna District maintained up-to-date status reports on the program and, at the urging of Division Engineer Groves, kept a detailed chart of the mission's progress.<sup>38</sup>

In response to Colonel McElhenny's desire to pin down the magnitude of the Corps' mini-repair commitment in Wilkes-Barre, Frank Carlucci established an application deadline of 10 September.<sup>39</sup> There was no other way to end the program. Nor was there any other way the Corps could guarantee that house repairs would be complete before cold weather.

Initially the Elmira Area Office greatly underestimated public response to mini-repair. Expecting about 200 homes to be accepted for the program, the office was overwhelmed with requests. More than 1000 homes in New York's Chemung and Steuben Counties were ultimately repaired. Applications there had to be cut off on 29 August.

On 6 September Colonel McElhenny informed Carlucci that SED intended to bring outside contractors to Wilkes-Barre to assist in mini-repair. Carlucci agreed with McElhenny's assessment that the estimated 3000-4000 homes in Wilkes-Barre were beyond the capabilities of local contractors.<sup>40</sup> Negotiations with John Kohler, a Philadelphia mechanical contractor, were already underway, and discussions soon followed with officials of Morrison-Knudsen, Inc., the Idaho firm already performing mobile home gas hook-ups for the Engineers. By 14 September a final decision was announced: four outside contractors were to be used to hasten home repairs in the Wilkes-Barre area.

In addition to Morrison-Knudsen and Kohler, the Corps selected two other Philadelphia firms — Atlas Heating and Cooling and PBS, Inc. These firms accepted letter contracts covering 1900 homes in Luzerne County. Morrison-Knudsen took on 1000 houses and the other

three firms, 300 houses each. At the time the new contracts were issued, 15 local contractors were already in the process of repairing 1052 homes. To monitor the now rapidly expanding mini-repair activity in Wilkes-Barre, SED sent its operations officer, Major Thomas R. Bennett, on temporary assignment as project engineer.

Colonel McElhenny later attributed the success of Susquehanna District's mini-repair operations to the outside firms, particularly Morrison-Knudsen.<sup>41</sup> However, the decision to use non-area contractors came in the midst of a controversy in Wilkes-Barre involving local contractors and organized labor. One Wilkes-Barre contractor who wanted more work and disagreed with the district's assessment that he lacked capability got his Congressman to inquire why he wasn't getting the work. The answer was clear, as far as Colonel McElhenny was concerned. He had instructed the area engineer in Wilkes-Barre to keep local contractors in mini-repair so long as they performed satisfactorily, but the contractor in question had failed to complete any of the 70 homes already assigned.<sup>42</sup>

Wanting to do nothing to jeopardize the program and feeling there was still plenty of other work available for local contractors, Presidential Representative Carlucci upheld this Corps policy. To help quiet the ongoing controversy in Wilkes-Barre, assurances were given that Morrison-Knudsen, Kohler, Atlas and PBS would make every effort to employ local labor.

On 27 September McElhenny met with OEP's Francis X. Carney and urged a limited increase in the \$3000 ceiling for repairing individual homes. During the course of the work it had developed that some repairs originally estimated at less than \$3000 would cost more, and the district engineer wanted authority to go beyond the limit without securing OEP assent on each case. Two days later, after gaining approval from OEP officials in Washington, Carney authorized an increase to \$3500. The change was limited to houses "referred by HUD to the Corps ... which, upon investigation, were scoped and estimated to cost less than \$3000; but were later found to require repairs exceeding \$3000."<sup>43</sup>



On 6 October, McElhenny requested another increase in authority to go to \$4500 for 150 houses and to \$4000 in the case of 300 others. The units in question were mostly heavily damaged older homes in south Wilkes-Barre and Kingston; the work involved was generally electrical and mechanical. This time George M. Grace, assistant director for disaster programs of OEP, refused the request, suggesting that homes expected to exceed existing limits be rejected unless they were already occupied. In that case the excess work should be applied for under a loan from the Small Business Administration. However, Grace did approve a five percent overrun which was interpreted to mean that five percent of the houses in the program in Luzerne County (about 150) could exceed the \$3500 unit cost.

Susquehanna District often had to coordinate its programs with similar ones being undertaken at the state and local level. In the case of mini-repair, liaison was primarily required with the Wilkes-Barre Redevelopment Authority, a city agency whose own interim assistance program, directed at south Wilkes-Barre, was operated with funds obtained from HUD. Interim assistance resembled mini-repair except the former program included work above the first floor, considered its repairs to be permanent, and established no dollar limit.

Concern arose when the Susquehanna District realized that some homes contracted under interim assistance were also enrolled in mini-repair. An agreement was reached that the Redevelopment Authority would accept such units only after mini-repair work was completed. Frank Carlucci's office advised the victims involved in mini-repair that "there is nothing to be gained by switching to the Interim Housing program."<sup>44</sup> By establishing the value of both programs, Carlucci apparently averted a situation potentially disruptive to the overall housing effort.

Two major problems were encountered with the final inspection phase of mini-repair. One involved complaints that the inspectors were citing contractors for failure to complete work which was never intended to be included in the program. This situation required continual monitoring of the inspection process.

The second problem area, in the Wilkes-Barre area engineer's view, "caused more hard feelings between the Corps and the community than any other."<sup>45</sup> A rather heated controversy developed in early October over the city of Wilkes-Barre's insistence that city inspectors approve mini-repair work. The Corps' position was that "the city had no business worrying about temporary repairs," although it was entirely proper for them to require that heating and electrical work meet city codes.<sup>46</sup> After joint inspections were made between the 4th and 6th of October, Thomas R. Bennett concluded that the Corps could only seek to identify valid violations and correct them. After that, the city would have to take over.

During the course of its mini-repair mission the Corps of Engineers again encountered public confusion. There was a tendency to distrust federal officials and the information they provided. Also, people simply thought the government should do more. In this case, what needed to be stressed to them was that OEP had not only limited the type of repairs but also the amount of money that could be spent. A significant number of complaints pertained to the quality of carpentry work. Indeed, warping eventually occurred because door and window frames were still drying out and fairly low quality wood was used, but this was actually expected. Mini-repair, after all, was temporary: it attempted to give a homeowner a door where there was none, to provide the minimal security for occupying a home. Later, with the assistance of a loan from the Small Business Administration, the owner would correct initial imperfections, perhaps utilizing the same contractor originally hired by the Corps.

On the other hand, there were some obviously justifiable complaints in this as in other programs. Most arose from delays in construction — delays which usually resulted from extensive subcontracting and from poor geographical organization of work.<sup>47</sup> Complaints frequently resulted in letters of inquiry from members of Congress. After Tropical Storm Agnes, the pressure was unusually intense, in the opinion of the Wilkes-Barre Area Office, not only because of the severity of the damage but also because it was an election year. Nevertheless, it was Corps tradition to treat



such inquiries thoroughly. The Wilkes-Barre Area Office even had specially designated people in its mini-repair section to handle complaints. "Since the established image of the Corps of Engineers for responsiveness was at stake," officials later related, "... every effort was made to properly follow up on every inquiry."<sup>48</sup>

Plainly, Corps employees did not always find the limitations of their orders easy. As one estimator working out of the Elmira Area Office said at the time:

Sometimes you feel sorry for the people if their home is damaged and there is no way the home can be made livable for \$3000. It kind of tears you up that you can't do more for them.<sup>49</sup>

In some respects, however, homeowners made out quite well: many temporary repairs actually turned out to be permanent improvements. This was usually true in the case of repairs to heating and hot water systems and electrical repairs. For example, when it was discovered that damaged units were so old that replacement parts could not be found, scores of furnaces were replaced rather than repaired.<sup>50</sup>

A simultaneous mission that sought goals similar to mini-repair but on a smaller scale was dubbed "Power to the People." It was also another example of support given the Susquehanna District by military units, in this case, the Navy Seabees. Seabees on temporary duty from four Naval bases outside Pennsylvania were assisted by Navy personnel from the Philadelphia Navy Base and volunteer electricians in the Naval Reserves. Beginning 18 July they made inspections of heavily damaged homes in Luzerne County under the general

supervision of the Wilkes-Barre Area Office. Project chief for the program was Norm Brodoski, who was attached to the Philadelphia Navy Base and volunteered for service in SED.

Three times OEP extended the Power to the People program due to its success and the continued demand for restoration of power in the Wyoming Valley. By the time the program was completed on 15 October, power had been restored to 3100 homes.

By the time the mini-repair program was ended, the Susquehanna District had overseen the completion of 3965 units at a cost of about \$11.6 million. All but 105 of the units were located in the area of Wilkes-Barre, Corning and Elmira. A majority of the work was accomplished in just six weeks! Presidential representative Carlucci felt the effort represented an outstanding performance. "I can't overstate the role the Corps of Engineers and their contractors have played in providing much needed housing to the flood victims ... with their accomplishment of the Mini-Repair Program," Carlucci concluded.<sup>51</sup>

North Atlantic Division Engineer Groves termed mini-repair "the most successful by far" of the Corps of Engineers' projects after Tropical Storm Agnes. Why? "Because it brought us into contact with people more directly, and above all, it kept people in their homes."<sup>52</sup> Captain George M. Snow, a project engineer in the Elmira Area Office, believed the program had an important psychological effect on disaster victims at a time when they really needed a lift. "When you tell a family that you are going to assist them in repairing their home," Snow declared, "there are no words that can describe the relief and gratitude that appears on their faces."<sup>53</sup> Wilkes-Barre Area Engineer Cook put it very simply: "Mini-repair was a real humanitarian effort."<sup>54</sup>







# Chapter IV - Secondary Mission Assignments

In addition to its major missions — debris removal, mobile home site preparation and mini-repair — Susquehanna District had others not so grand but of none the less crucial importance to disaster recovery. Three such tasks were temporary bridging, public utility repair and project application support.

## TEMPORARY BRIDGING

Tropical Storm Agnes destroyed more than 200 bridges in New York and Pennsylvania, and the Corps of Engineers was called upon to help replace the most critical of them. Demonstrated inability to do the work on the part of state and local governments and proof that a real threat to safety, health or the economy existed were required before Corps intervention. Where feasible the Corps erected temporary crossings utilizing corrugated pipes, but engineering requirements sometimes necessitated more sophisticated bridging or prohibited a temporary solution altogether.<sup>1</sup>

Initial mission assignments for temporary bridging came from the Office of Emergency Preparedness when Baltimore District was still handling the Corps' response in the Susquehanna River basin, but most of the work was accomplished by the Susquehanna District. Arrangements were eventually made between the district and the departments of transportation in Pennsylvania and New York covering the installation, financing, maintenance and removal of the bridges. The agreement for

Pennsylvania, signed on 25 July, made the Engineers responsible for delivery, erection and removal of the bridges. The state was to provide necessary land and maintenance.

The entire operation was another area of disaster recovery activities requiring close coordination between the Corps and state and federal officials. To assist the liaison officer, Captain Boyd D. Ashcraft of the U.S. First Army, 76th Engineer Battalion, was brought to the district as bridge coordinator. Since all elements in the Corps' chain of command were vitally interested in Susquehanna District's accomplishments, a significant part of the bridge coordinator's job was submitting reports to higher headquarters.

For temporary bridging, the Corps generally utilized U.S. Army Bailey-type bridges. Stored in Army depots around the country, Bailey bridges are used primarily to provide temporary crossings during times of war. The structures have the advantage of mobility and versatility. The bridge is mobile because it comes in sections that are easily transported, and versatile because the same standard parts can be designed to carry a variety of loads depending on expected traffic. Bailey bridge sections were readily obtained through the U.S. Army Mobility Equipment Command (MECOM) from the Marion Army Depot, Marion, Ohio. They had one additional advantage: they could be rapidly constructed.

The Pennsylvania Department of Transportation proposed sites for temporary bridges to the







Corps after which an inspection was conducted to determine feasibility. Deciding to go ahead with a project was not always easy. There were a multitude of considerations from the geography of the site and community need to the length of existing detours.

In cases of disagreement or complicated alternatives, meetings were held between officials of the Corps, the Federal Highway Administration and the Pennsylvania Department of Transportation. As a result, not every proposed bridge was built. A case in point was Pennsylvania's desire to have a bridge erected at Keating in Clinton County. District personnel felt it more practical to use a nearby railroad bridge than to erect a Bailey — a move that would save \$160,000.<sup>2</sup> State officials found this solution unsatisfactory. An impasse resulted, and the Engineers never put up a temporary bridge at the site.

Altogether Susquehanna District let contracts for 15 Bailey bridges — 14 in Pennsylvania and one in New York. Largest of the bridges was the 470-foot span placed over the Chemung River in Elmira. Engineers accomplished the feat in just 22 days. The district utilized technical advisors from the 76th Engineer Battalion to supervise the construction. Once erected, temporary Bailey bridges were turned over to the state for maintenance. Most problems associated with the mission arose in that area.

Susquehanna District voiced repeated concern when inspections revealed sagging braces, loose clamps and missing safety pins in completed structures.<sup>3</sup> An inspection tour in mid-September led the Sunbury Area Office to conclude that maintenance was "being conducted by individuals which do not understand how their actions effect the life of the bridge."<sup>4</sup> In fairness it should be noted that the whole situation was aggravated by the lack of clearly defined responsibility. Still, Susquehanna District employees spent considerable time attempting to keep abreast of problems for which they were technically not responsible.

One bridge failure occurred early in Susquehanna District's operations, but the incident was not related to maintenance or construction.

The Orangeville Bridge in Columbia County, Pa., completed 23 July and turned over to the state the following day, collapsed on the 26th under the weight of a tractor-trailer loaded with animal feed. The bridge buckled under weight nearly double its capacity. A bridge in Sunbury was also truck-damaged but did not collapse. As a result, the Susquehanna District launched a concerted campaign to warn residents in the disaster area of the dangers posed by the temporary spans. In September the Corps, acting at the request of the state, replaced the Orangeville span.

Agnes' raging floodwaters destroyed the five-span bridge over the Susquehanna at Laceyville, but the length of the crossing presented too difficult and expensive an engineering problem for a temporary Bailey bridge. Instead a four-float raft propelled by two 27-foot bridge erection boats was brought from Fort Belvoir, Va., and elements of the U.S. First Army, 11th Engineer Battalion, were deployed to man the operation.

The raft would be needed for at least one and one-half years, but the Army wanted Pennsylvania's Department of Transportation to take it over as soon as possible. Corps of Engineers personnel involved in trying to effect a transfer of responsibility for the rafting operation cited the high cost of maintenance, fuel and temporary duty pay.<sup>5</sup> By 10 August Colonel Charles E. Eastburn, the district liaison officer, was strongly recommending that the Army establish a definite cut-off date for the ferry service as a means of jarring the state into action. A group of local citizens even tried to acquire a raft they could maintain themselves but failed.<sup>6</sup> Interest of Congressman Joseph McDade of Pennsylvania's 10th District apparently was largely responsible for continuation of the rafting operation under military auspices. Ultimately the raft at Laceyville remained under Army supervision from 1 July to 15 November, during which time over \$25,000 was expended.

Dismantling the temporary bridges and returning the sections for reuse in other disasters or time of war was costly. The average expense per bridge was \$20,000, and the Corps estimated that Fishing Creek Bridge at Orange-



ville would run as high as \$34,000.<sup>7</sup> Transportation for each set of bridging from anywhere in Pennsylvania to the Marion Depot was another cost factor. By 1 September 1974 only four of the 15 bridges erected by Susquehanna District had been removed. Corps personnel in the Harrisburg Resident Office, Baltimore District, were given responsibility for coordinating the task after 30 November 1972.

## **PUBLIC UTILITY REPAIR**

The Susquehanna District helped out again in cases where public utilities — water supply and sewage collection and treatment facilities — were damaged beyond capabilities of local government to make repairs in a reasonable period of time. OEP tasked SED to make repairs on the Tunkhannock Dam, northeast of Wilkes-Barre, on the DeHart Dam, controlling Harrisburg's central water supply, and on scattered water facilities where real emergency situations prevailed, but most of the 184 water systems damaged in Pennsylvania were repaired without Corps assistance. Sewage plants on the other hand presented a greater challenge, particularly in Harrisburg and in Luzerne County, where

approximately \$2.9 million was committed. The district took over the largest project, the restoration of the Wyoming Valley Sanitary Authority, and carried on until 1 September, when the facility was partially operational and OEP terminated Corps responsibilities. Involvement of the Engineers was vital as the Wyoming Valley plant served 14 municipalities, collected waste from 19 pumping stations, and was serviced by 35 miles of sewer line. Not only the main treatment plant but also most of the pumping stations were flooded. High water from the Susquehanna washed one station completely away.

Relatively late in the Susquehanna District mission, OEP asked the Corps to restore the standby water-treatment filtration system and water pumping station on City Island and at Front and North Streets in Harrisburg. This was one case where the Engineers returned a request to OEP with the suggestion that the work would be better accomplished through a project application from Harrisburg. The Corps' decision came after an inspection by the Harrisburg area engineer and his assistant determined that the system, which was not the state capital's primary source of water, was too





antiquated to repair. A major factor was the indeterminate cost: an original damage survey report had already been revised by nearly 200 percent.<sup>8</sup> The area engineer thus recommended that the city replace the facility rather than attempt to repair it, and OEP subsequently withdrew the request.

The district engineer thought this episode a good example of how the federal government put engineering advice from the Corps to good use in making decisions related to disaster recovery. In Colonel McElhenny's words: "OEP never tried to override us if we did not feel we should do something."<sup>9</sup>

## PROJECT APPLICATION SUPPORT

The Disaster Relief Act of 1970, Public Law 91-606, included project application provisions enabling local communities to contract flood-related repair work themselves and be reimbursed by the federal government so long as the expenditure was approved in advance by OEP. Roadwork, drainage facilities and debris removal were the major work categories for which applications were made.

When necessary to give local communities the financial capability to proceed, OEP made advance payments of 75 percent. The remainder was presented after final inspection of the completed project and an audit. The key to success in this OEP program was speed. To achieve it, OEP turned to the Army Corps of Engineers.

The Corps was tasked to process advance and final payments, and to perform interim and final inspections and audits. Initially Corps involvement was limited to applications of \$50,000 or less. In Pennsylvania, Corps responsibility included applications for projects within the jurisdiction of the Pittsburgh Engineer District. In New York, applications were channeled through the Elmira Area Office before coming to the Susquehanna District office. Elmira had its own project application section.

Recognizing the potential magnitude of this mission, SED established a project application section in the construction branch of the operations division. All approved applications

for Pennsylvania and New York flowed from OEP through this section. Thereafter close interaction with SED's fiscal branch was a necessity: the goal for processing advance payments was 24 hours.

The district processed its first project application on 23 July and made the first advance payment on 10 August. At the outset the workload was light, so the section took the opportunity to refine and consolidate its procedures. The move paid off. When district involvement with the program reached its height in September, the project application section processed 106 applications and disbursed 71 advance payment checks in one 24-hour period.

On 18 August 1972, OEP broadened the mission to include advance payments for applications over \$50,000. In Colonel McElhenny's view, the reason for the change was clear: it took OEP two weeks to process payments through Washington, and the Corps was doing it much faster in Harrisburg. "It didn't make much difference what the amount was, you still wrote the same check."<sup>10</sup>

As SED prepared to close out its project application capability near the end of October, it recorded 1193 advances on projects under \$50,000 totaling \$10,515,181 and 368 advances on projects over \$50,000 totaling \$38,467,021. District Engineer McElhenny felt later on that the Corps' role in project application advance payments was a high point of the Agnes mission. In his words:

Getting money out to small communities, townships and boroughs rapidly made them feel a lot more confident and showed them the government was trying to respond promptly and effectively.<sup>11</sup>

To dramatize the concern of the federal government and at the instigation of Presidential representative Carlucci, advance payment checks were sometimes publicly presented to applicants by the district engineer and a representative of OEP.

Inspections and audits were another matter. Since there was no way applicants could com-



plete work on their projects within the anticipated lifespan of the Susquehanna District, it was expected that inspections and audits would later need to be transferred to one of the permanent districts. Yet, while SED existed, the inspection task alone was substantial. Final inspections were required for every damage survey report — and there were ten on average — accompanying a project application. In addition, interim inspections were conducted on some projects as work proceeded. Inspections were handled by the district office or the appropriate area office, a situation requiring close district-area office interaction and at times overburdening their staffs. In accordance with a decision reached when SED was established, audit responsibilities were handled by Philadelphia District. Additional support in this area came from the North Atlantic Division.

As with other disaster programs, there were problems encountered by the Corps in administering project applications. In some cases supplements were necessary if the contractors' bids, including the lowest, exceeded previously approved funds; in other cases, approved amounts later had to be reduced because of unjustifiable labor rates, excessively high unit price costs, or inclusion of ineligible work items.<sup>12</sup>

Some confusion developed when it was discovered that a few project applications included reimbursement claims for work actually accomplished by the Corps. The situation arose when Corps area offices took over a contract already let by a local community. When the job was done, the community involved submitted a project application asking reimbursement for its part of the work, but the percentage it had actually accomplished was not always accurately determined. When OEP and the Engineers realized what was happening, the district liaison officer became involved in recurring efforts to avoid this predicament through coordination with OEP and project applicants.<sup>13</sup>

In mid-October selected Philadelphia District personnel began on-the-job training in project application procedures prior to transfer of SED's capability to their home district. That occurred on 29 October. Management of project application responsibilities first taken on by the Susquehanna District was still being handled by Philadelphia in 1974. Division Engineer Groves assigned responsibility for applications still pending in New York State to the New York Engineer District as of 25 October 1972.

#### PL 91-606 MISSION ESTIMATES<sup>a</sup>

(Thousands of Dollars)

Category of Work	Area 1 Towanda	Area 2 Wilkes-Barre	Area 5 <sup>b</sup> Harrisburg	Area 8 Reading	Pennsylvania Subtotal	Area 9 Elmira	District Total
1. Debris Removal	1,790	19,500	5,592	5,052	31,934	6,566	38,500
2. Water Plants	0	27	230	0	257	0	257
3. Sewage Plants	4	1,553	1,190	180	2,927	0	2,927
4. Roads and Bridges	40	0	625	67	732	168	900
5. Mobile-Home Sites	146	20,400	3,926	215	24,687	7 <sup>c</sup>	24,694
6. Other Public Facilities	0	928	1,029	0	1,957	92	2,049
7. Dikes and Levees	20	0	563	0	583	58	641
8. Miscellaneous	16	470	250	0	736	66	802
9. Mini-Repairs	10	8,900	95	5	9,010	2,629	11,639
Total	2,026	51,778	13,500	5,519	72,823	9,586	82,409

<sup>a</sup>Data from situation report of 28 November

<sup>b</sup>Includes expenditures of Areas 3, 4, 6, and 7

<sup>c</sup>Includes design costs for a site not constructed



## Chapter V - Deactivation and Assessment

When the Susquehanna District was set up, Division Engineer Groves admonished SED leaders that their objective was to get in and get out of the disaster area as fast as possible.<sup>1</sup> Such a goal required that phase-down operations be a concern from the beginning. The Baltimore district engineer, himself the head of a permanent organization, was impressed by the fact that people in SED “from the very top had the primary drive to dissolve their organization, and they worked to get rid of their job.”<sup>2</sup>

Detailed plans for consolidating existing area offices were reviewed at an area engineers’ meeting less than two weeks after the district’s establishment. Consolidation was geared to respond to an anticipated decline in mission activity in various parts of the district. Accordingly, on 6 August York Area Office became a resident office under Harrisburg as did the Lewistown Area Office on 13 August. That same day the Lock Haven Area Office became a resident office under Sunbury. Initially scheduled to join Sunbury on 20 August, the Towanda Area Office was retained until 31 October after receipt of an unexpected assignment — the resurvey of stream clearance damage reports. Thus, by the end of August Susquehanna District’s nine original area offices were already reduced to six.

Another round of consolidation began in October in the final weeks of SED’s operations. On 15 October the Reading Area Office, which lay within the normal civil works boundaries of the Philadelphia District, was transferred back

to that district. Sunbury’s Lock Haven Resident Office was abolished on 22 October. The Sunbury Area Office, itself a consolidation of offices, got resident status under Harrisburg on the 29th and was abolished altogether on 5 November. Elmira Area Office responsibilities, together with those of Towanda, went to the Baltimore District on 31 October, and Harrisburg rejoined Baltimore on 15 November. All Wilkes-Barre Area Office functions except mini-repair and contract finalization — tasks to be completed by the 21st — were also transferred to Baltimore on 15 November.

Consolidation of the Susquehanna District’s area offices involved the transfer of all active contracts and some local-hire personnel. Contracting effectiveness benefited noticeably as a result. Whether the move was within SED or to another district, the process occurred smoothly. Every effort to plan and coordinate these changes was made by representatives of the Susquehanna, Baltimore and Philadelphia Districts, the North Atlantic Division, the Chief’s Office and OEP.

Inactivation of Susquehanna District headquarters, which paralleled developments within OEP’s organization, engaged the attention of Colonel McElhenny and his staff throughout much of November. Contracts were finalized, plans were made for turning in district equipment and supplies, a district after action report was prepared, and files were screened for transfer to appropriate districts.

Flag-lowering ceremonies marking the dis-



solution of the Susquehanna District began at the Shiremanstown headquarters at 1100 hours on 30 November 1972. Snow and a chill wind that day signalled the arrival of winter, whose effects the disaster mission had in great part been trying to forestall. The 76th Engineer Battalion supplied the honor guard. General Andrew P. Rollins, the deputy chief of engineers, General Groves and Colonel McElhenny spoke briefly. A reception and luncheon in the U.S. Steel Building followed.

Susquehanna District paid tribute to those individuals who had made outstanding contributions to its mission. To military officers went the Army Commendation Medal or a letter of recognition and to civilians, a letter or certificate signed by the Chief of Engineers or special service awards in cash amounts up to \$1000. Mary Wilson received the highest civilian award from General Groves in Philadelphia a few days after the flag-lowering ceremonies.

Corps of Engineers involvement in the Susquehanna River disaster area did not end with the dissolution of the Susquehanna District: flood protection work under Public Law 84-99 continued as did contract management and project application support. Long-term studies for future flood protection and flood plain management were launched. But the short existence of SED — just over four months — seems a remarkable instance of administrative efficiency on the part of a branch of the federal government. The speed with which contracts were awarded and payments made during the summer and fall of 1972 were key elements in the Susquehanna District's successful performance. Moreover, as stressed above, the district was singularly oriented toward getting its job done and toward disengagement. Every effort had been made to phase out district units as soon as possible.

Susquehanna District was a truly cooperative effort by all parts of the Corps. Personnel from districts and divisions were bound together in a common cause; lasting friendships were made, and a spirit was generated that infused the whole organization. Many Corps disaster personnel gained a sense of purpose and accomplishment from the work they did. The results

were tangible; people in desperate circumstances were being helped. Quite striking aspects of the role of the Corps of Engineers and its Susquehanna District were the quickness and efficiency of their response. These qualities were in no small part due to the unique combination of military and civilian personnel throughout the Corps and to an equally noteworthy decentralization of authority. That military officers were accountable to their superiors for their performance provided a measure of discipline lacking in many civilian controlled agencies. Decentralization at all levels meant decisions could be made without seeking higher approval. In particular the captains utilized by SED commented repeatedly on the importance of having contracting officer and other decision-making authority. Their having such authority indicated the confidence placed in them by their superiors.

The district liaison officer was in one of the best positions to notice how Corps methods compared with other agencies and he stated:

One thing I was proud of was our lines of command and responsibility have always been decentralized down as low as we can get them. I never made a decision that was not backed up by Colonel McElhenny and the people in the district. So I sort of . . . assumed that responsibility. Colonel McElhenny said . . . go do the job and that was . . . the guidance, so I did it and it was backed up. It's not true in the other agencies. Many times a representative . . . if he is not the senior official does not have the authority to make a decision, and he has to go back and run it all through his people and that delays it.<sup>3</sup>

Following tradition, the Corps made self-evaluation a central part of the Susquehanna District deactivation. The process began as early as 30 August when NAD requested interim after action reports from its districts. Later, members of the Agnes recovery team at all



levels prepared after action reports detailing their activities and making recommendations for future operations. Most felt the disaster effort provided experience in the workings of the Corps that would likely never be duplicated and that local communities had benefited from their efforts, but nearly everyone had suggestions for improving upon the Agnes response.

Probably the most frequently cited problem was the turbulence resulting from the use of temporary duty personnel on assignments that rarely extended for the life of the district. As noted earlier, no agreement was reached on how best to cope with the problem. Men who had served in the field tended to favor longer temporary assignments. The district after action report suggested that a cadre of individuals constituting a "redi-district" for such emergencies as Agnes was the best solution. Under such an arrangement personnel would generally be expected to remain with the temporary district for the entire period of its existence. Another benefit would be rapid mobilization: the individuals comprising the redi-district would be identified in advance.

While such solutions had merit, many Corps officials remained unconvinced. Division Engineer Groves did not feel that personnel turbulence was really a significant problem in the Agnes operation. Moreover, he opposed the idea of blanket requests for extended temporary duty assignments because it could result in less qualified individuals. Few districts or divisions would be inclined to send their best for a lengthy commitment. "I would rather have a rapid turnover and have the right people," Groves concluded.<sup>4</sup> Colonel Richard J. Hesse of NAD further suggested that personnel turbulence was perceived differently from various vantage points in the Corps. Of course, personnel changes were upsetting to Susquehanna District leaders and to the area engineers in particular, but the division engineer and the Chief of Engineers viewed the problem in terms of the overall requirements and needs of the Corps of Engineers.<sup>5</sup>

As far as the North Atlantic Division was concerned, in future disaster recovery personnel would be drawn from a pool of experienced individuals but no effort would be made to

assign positions in advance. How could you be sure, General Groves asked, that your designated people would be available when you needed them?<sup>6</sup>

Officers from the advanced course at Fort Belvoir especially registered specific complaints about insufficient guidance from OEP and insufficient briefings by the Corps. Inadequate training in disaster recovery was another frequently cited problem. In most cases, these were difficulties exacerbated by the extreme conditions surrounding Tropical Storm Agnes. Yet they were circumstances which the Corps and other federal agencies ought in great degree to be able to remedy. North Atlantic Division has subsequently conducted its flood emergency exercises with the idea of applying some of the lessons learned in Agnes to benefit both Corps personnel and local communities. The U.S. Congress passed a new disaster relief act in May 1974 after hearings on the effectiveness of the 1970 act during which experiences following Agnes were considered in depth.

Forming a distinct administrative entity to deal with Agnes recovery under the Disaster Relief Act of 1970 was perhaps an extreme response on the part of the Corps, but it seems to have been entirely the right move in view of the situation following Agnes. Clearly, existing districts could not have handled the challenge as efficiently. So many districts and divisions had civil works authority in the region affected by the storm that there could not have been effective coordination either internally or externally, and the Baltimore District was simply overburdened. Because the federal government intended to rely so heavily on the contracting capabilities of the Engineers, an organization that could be fully effective was essential.

Utilization of a special unit in the wake of Agnes, however, did not mean the Corps had found a mechanism suitable for all its future disaster missions. Most Corps officials agreed the establishment of SED was a wise, even brilliant move, but no one suggested blanket use of the technique in the future. General Groves did think a temporary district should be used again in cases where the Corps had to get a large number of contracts underway in a short



period of time.<sup>7</sup> Colonel Hesse, while thinking that the creation of the Susquehanna District was a good decision, argued: "I don't think for a minute that it should necessarily set a precedent for doing this kind of thing again. If there is any way you can do it effectively, in your existing structure, that is more desirable."<sup>8</sup> Both Groves and Hesse reached these conclusions on the basis of significant experience with other disasters as well as with Agnes.

No federal, state or local agency could have expected to escape criticism in the climate following Agnes. Rushing to overcome suffering and the change of seasons, utilizing borrowed and often inexperienced personnel, relying on contractors from near and far coordinating with a multitude of other organizations all providing assistance, and continually dealing with individuals stunned by what happened to them presented tremendous challenges to all involved in the disaster relief. Victims of the storm's devastation expected much from their governments and cared little how they got the help. Any delay — there was too much but there had

to be some — generated frustration. It was in this climate that the role of the Corps of Engineers — one of the most visible agencies involved — was sometimes misunderstood, and this misunderstanding was probably the single most important cause of criticism leveled at the Corps. On the other hand, unfavorable comments on Corps damage estimates were quite valid. Though guidance was unclear, inexperience and excessive estimates on the part of some Corps inspectors were crucial factors.

What the Agnes experience demonstrated was that each disaster has a character all its own, that no single response is possible, and that the federal agencies fighting the disaster must have flexibility. Otherwise the interests of the victims and the needs of state and local governments are not best served. And meeting these needs is, after all, the goal of federal disaster assistance. Susquehanna District was a timely administrative experiment. The remarkable come-back of Susquehanna River valley communities is in great part testimony to the district's success.



# Notes

## Chapter I

<sup>1</sup>Information on rainfall and flooding has been compiled from Richard M. DeAngelis and William T. Hodge, *Preliminary Climatic Data Report, Hurricane Agnes, June 14-23, 1972*, National Oceanic and Atmospheric Administration Technical Memorandum (Asheville, N.C.: U.S. Department of Commerce, 1972); Gannett, Fleming, Corddry and Carpenter, "Tropical Storm Agnes, June 1972," a draft report to U.S. Army Engineer District, Baltimore (December 1973); the *Harrisburg Patriot*; and the *Wilkes-Barre Times-Leader, Evening News, Record*.

<sup>2</sup>U.S., Congress, Senate, Subcommittee on Disaster Relief of the Committee on Public Works, *Hearings, To Investigate the Adequacy and Effectiveness of Federal Disaster Relief Legislation*, 93rd Cong., 1st Sess., 1973, p. 1506.

<sup>3</sup>See *Congress and the Nation* (Washington: Congressional Quarterly Service, 1973), III, pp. 182-184, for a discussion of federal disaster relief.

<sup>4</sup>Senate, *Hearings*, p. 1252.

<sup>5</sup>Interview with General Richard H. Groves, 17 July 1974.

<sup>6</sup>*Wilkes-Barre Times-Leader, Evening News*, July 11, 1972.

<sup>7</sup>Interview with Colonel Louis W. Prentiss, 9 August 1974.

<sup>8</sup>Richard H. Groves, "The Agnes Disaster," *Military Engineer*, LXIV (November-December, 1972), 386.

<sup>9</sup>*Ibid.*

<sup>10</sup>*Scranton Times*, July 5, 1972; *Lock Haven Express*, July 5, 1972.

<sup>11</sup>*Harrisburg Evening News*, July 3, 1972.

<sup>12</sup>*Harrisburg Patriot*, July 8, 1972. The bus service continued until 18 October.

<sup>13</sup>Mary Ann Striffler, "Legacy of Agnes: The Road Back," *Water Spectrum*, IV (Winter, 1972-1973), 25.

## Chapter II

<sup>1</sup>Interview with General Richard H. Groves, 17 July 1974.

<sup>2</sup>Interview with Colonel Louis W. Prentiss, 9 August 1974.

<sup>3</sup>Groves interview, 17 July 74.

<sup>4</sup>Interview with Colonel Richard J. Hesse, 26 July 1974.

<sup>5</sup>Morris to Groves, 13 July 1972, North Atlantic Division Engineer's files.

<sup>6</sup>Morris to Clarke, 13 July 1972, NAD Division Engineer's files.

<sup>7</sup>Morris to Groves, 13 July 72.

<sup>8</sup>Groves interview, 17 July 74.

<sup>9</sup>OEP Press Release, July 17, 1972, Box 337, Susquehanna District files.

<sup>10</sup>Prentiss interview, 9 August 74.

<sup>11</sup>Groves interview, 17 July 74.

<sup>12</sup>Hesse interview, 26 July 74. Interview with Colonel John F. McElhenny, 19 July 1974. U.S., Army, Corps of Engineers, Susquehanna District, *After Action Report: Tropical Storm Agnes* (Harrisburg: December, 1972), p. 15.



## Notes (cont'd)

- <sup>13</sup> McElhenny interview, 19 July 74.  
<sup>14</sup> Interview with Mary Wilson, 27 August 1974.  
<sup>15</sup> Interview with Colonel Charles E. Eastburn, Jr., 24 July 1974.  
<sup>16</sup> *Ibid.*  
<sup>17</sup> *Ibid.*  
<sup>18</sup> *Ibid.*  
<sup>19</sup> McElhenny interview, 19 July 74.  
<sup>20</sup> Questionnaire to Colonel Christ F. Potamos, September 1974. These meetings, not necessarily attended by the entire staff at all times, were held twice daily in the beginning.  
<sup>21</sup> Wilson interview, 27 August 74.  
<sup>22</sup> Memo, 23 August 1972, Box 337, SED files.  
<sup>23</sup> Interview with Major Robert Cook, 19 August 1974.  
<sup>24</sup> Groves interview, 17 July 74.  
<sup>25</sup> Interview with Paul Baggett, 22 July 1974.  
<sup>26</sup> McElhenny to Area Engineers, 15 September 1972, Box 337, SED files.  
<sup>27</sup> Interview with Thomas Muldowney, 1 August 1974. McElhenny interview, 19 July 74.  
<sup>28</sup> Captain William Malone, After Action Report, 10 November 1972, Harrisburg Resident Office files.  
<sup>29</sup> Eastburn interview, 24 July 74.  
<sup>30</sup> Muldowney interview, 1 August 74.

## Chapter III

- <sup>1</sup> Richard H. Groves, "The Agnes Disaster," *Military Engineer*, LXV (January-February, 1973), 19.  
<sup>2</sup> Mary Ann Striffler, "Legacy of Agnes: The Road Back," *Water Spectrum*, IV (Winter, 1972-1973), 28.  
<sup>3</sup> Memo, Potamos to McElhenny, 31 August 1972, Harrisburg Resident Office Files.  
<sup>4</sup> Memo for record, "Debris Pits in the Wilkes-Barre Area," William P. Eng, 6 September 1972, Harrisburg files.  
<sup>5</sup> Interview with General Richard H. Groves, 17 July 1974.  
<sup>6</sup> Captain Michael R. Arterburn, After Action Reports, 28 August and 24 October 1972, Harrisburg files.  
<sup>7</sup> U.S., Army, Corps of Engineers, Susquehanna District, *After Action Report: Tropical Storm Agnes, Supplement* (Harrisburg: December, 1972), p. 66. A sample stream clearance contract is reproduced on pp. 165-168 of the supplement.  
<sup>8</sup> Wilkes-Barre *Times-Leader, Evening News, Record*, September 17, 1972.  
<sup>9</sup> Status of Stream Clearance Contracts, Towanda Area Office, Box 337, Susquehanna District files.  
<sup>10</sup> U.S., Army, Corps of Engineers, Susquehanna District, *After Action Report: Tropical Storm Agnes* (Harrisburg: December, 1972), p. 34.  
<sup>11</sup> Memo for record, "Eligibility Requirements for Stream Debris Removal in Tioga County," Charles E. Eastburn, 27 September 1972, Harrisburg files.  
<sup>12</sup> Daily log, Towanda Area Office, 20 September 1972, Box 331, SED files.  
<sup>13</sup> Memo for record, Charles E. Eastburn, 27 October 1972, Harrisburg files. Susquehanna Engineer District Daily Journal, 27 October 1972.  
<sup>14</sup> Captain Charles Mills, After Action Report, n.d., Harrisburg files.  
<sup>15</sup> Memo, Horton to Eng, 22 September 1972, Harrisburg files.  
<sup>16</sup> *Ibid.* McElhenny to Division Engineer, 18 October 1972, Harrisburg files.  
<sup>17</sup> Telephone call memo, Joseph D. Bodman to John Witherspoon, 21 September 1972, Harrisburg files.  
<sup>18</sup> Memo, Eastburn to McElhenny, 29 August 1972, Harrisburg files.  
<sup>19</sup> McElhenny to Division Engineer, 18 October 72.  
<sup>20</sup> Joseph Charneski, Lessons Learned in Natural Disaster Procedures, n.d., Harrisburg files.  
<sup>21</sup> Eugene R. Eisman and W. Roy Newsome, Jr., "Pennsylvania Officials Review Lessons Learned From Emergency Housing Program Following Tropical Storm 'Agnes,'" *Journal of Housing*, XXX (January, 1973), 31.  
<sup>22</sup> *Ibid.*, 32.  
<sup>23</sup> SED Daily Journal, 8 August 72.  
<sup>24</sup> *Ibid.*  
<sup>25</sup> Major Robert L. Cook and Major Gerald A. Vick, After Action Report, Operation NOAH-II, Wilkes-Barre Area Office.  
<sup>26</sup> Wilkes-Barre *Times-Leader, Evening News*, November 5, 1972. Memo, William Horton to O.J. Hewitt, 26 September 1972, Harrisburg files.  
<sup>27</sup> Striffler, "Legacy of Agnes," 29, quoting Major Harold L. Matthais.



## Notes (cont'd)

- <sup>28</sup> SED Daily Journal, 8 August 72.
- <sup>29</sup> *Ibid.*, 30 September and 2 October 72.
- <sup>30</sup> SED, *After Action, Supplement*, pp. 35-36. Major James A. Brueggeman, After Action Report, 23 October 1972, Harrisburg files.
- <sup>31</sup> SED Daily Journal, 1 and 3 September 72.
- <sup>32</sup> Captain Thomas N. Rumney, After Action Report, 25 October 1972, Harrisburg files.
- <sup>33</sup> U.S., Congress, Senate, Subcommittee on Disaster Relief of the Committee on Public Works, *Hearings, To Investigate the Adequacy and Effectiveness of Federal Disaster Relief Legislation*, 93rd Cong., 1st Sess., 1973, p. 1173.
- <sup>34</sup> Wilkes-Barre, *Times-Leader, Evening News*, January 8, 1973.
- <sup>35</sup> Cook and Vick, Wilkes-Barre After Action Report. The average cost of a pad was \$3300 and of a trailer, \$3900. See Eisman and Newsome, "Lessons Learned From Emergency Housing Program," 33.
- <sup>36</sup> Pennsylvania Department of Community Affairs, Mobile Home Site Report No. 19, September 24, 1972.
- <sup>37</sup> SED Daily Journal, 22 August 72.
- <sup>38</sup> *Ibid.*, 8 August 72.
- <sup>39</sup> *Ibid.*, 2 and 6 September 72.
- <sup>40</sup> *Ibid.*, 6 September 72.
- <sup>41</sup> Interview with Colonel John F. McElhenny, 19 July 1974.
- <sup>42</sup> SED Daily Journal, 18 and 22 September 72.
- <sup>43</sup> *Ibid.*, 29 September 72.
- <sup>44</sup> *Ibid.*, 4 October 72.
- <sup>45</sup> Interview with Major Robert L. Cook, 19 August 74.
- <sup>46</sup> Major Bennett's Daily Log, 4 October 1972, Box 334, SED files.
- <sup>47</sup> Cook and Vick, Wilkes-Barre After Action Report. Summary of Mini-Repair Program, 30 August 1972, Harrisburg files. Major Bennett's Daily Log, 2 October 72.
- <sup>48</sup> Cook interview, 19 August 74. Cook and Vick, Wilkes-Barre After Action Report.
- <sup>49</sup> Striffler, "Legacy of Agnes," 29, quoting Joe Jacobazzi.
- <sup>50</sup> McElhenny interview, 19 July 74. The value of these "permanent" repairs was deducted in cases where SBA loans were subsequently made.
- <sup>51</sup> OEP Press Release, Wilkes-Barre, November 2, 1972.
- <sup>52</sup> Groves interview, 17 July 74.
- <sup>53</sup> Captain George M. Snow, After Action Report, n.d., Harrisburg files.
- <sup>54</sup> Cook interview, 19 August 74.

## Chapter IV

- <sup>1</sup> U.S., Army, Corps of Engineers, Susquehanna District, *After Action Report: Tropical Storm Agnes, Supplement* (Harrisburg: December, 1972), p. 10. OEP Request No. 16 to the Corps assigned the mission of performing minimum work for temporary crossings at two sites in Dauphin County at a cost not to exceed \$79,299.
- <sup>2</sup> Potamos to Eastburn, 3 October 1972, Harrisburg Resident Office files.
- <sup>3</sup> Susquehanna Engineer District Daily Journal, 17 August 1972.
- <sup>4</sup> Frederick P. Howland, Jr., to Potamos, 18 September 1972, Harrisburg files.
- <sup>5</sup> Memo for record, Eastburn, 10 August 1972, Harrisburg files.
- <sup>6</sup> SED Daily Journal, 28 August 72.
- <sup>7</sup> Joint memorandum, Bailey Bridge Costs, 1 September 1972, Harrisburg files.
- <sup>8</sup> Interview with Paul Baggett, 22 July 1974. SED, *After Action, Supplement*, p. 10.
- <sup>9</sup> Interview with Colonel John F. McElhenny, 19 July 1974.
- <sup>10</sup> *Ibid.*
- <sup>11</sup> *Ibid.*
- <sup>12</sup> Memo, Winkle to OEP-MIC Coordinators, 18 September 1972; and Memo, Eastburn to McElhenny, 2 October 72, Harrisburg files.
- <sup>13</sup> Memo for record, Data on Project Applications, Eastburn, 31 July 1972, Harrisburg files. Conference Notes, Meeting with OEP, 3 October 72, Box 331, Susquehanna District files.

## Chapter V

- <sup>1</sup> Interview with Colonel John F. McElhenny, 19 July 1974.



## Notes (cont'd)

<sup>2</sup> Interview with Colonel Louis W. Prentiss, 9 August 1974.

<sup>3</sup> Interview with Colonel Charles E. Eastburn, 24 July 1974.

<sup>4</sup> Interview with General Richard H. Groves, 17 July 1974.

<sup>5</sup> Interview with Colonel Richard J. Hesse, 26 July 1974.

<sup>6</sup> Groves interview, 17 July 74.

<sup>7</sup> *Ibid.*

<sup>8</sup> Hesse interview, 26 July 74.



# Bibliography

Unpublished documents in the Susquehanna District files, presently housed in the Philadelphia District Records Branch, and files at Baltimore District's Harrisburg Resident Office, New Cumberland, Pa., were major sources of information for this study. The records include correspondence, disposition forms, memos, reports, logs and contract data. Files in the Emergency Operations Branch, Directorate of Civil Works, Office of the Chief of Engineers and in the offices of the emergency operations planners of North Atlantic Division and Philadelphia and Baltimore Districts were also consulted.

A great source of information and insight were interviews and correspondence with the following: Paul Baggett, John Barr, Carolyn Brenneman, Norm Brodoski, Major Robert L. Cook, Leo Corbett, Frank Doyle, Lt. Colonel Charles E. Eastburn, Charles Flachbarth, Bernard Gallagher, Maj. General Richard H. Groves, Colonel Richard J. Hesse, Captain Milton Hunter, Anthony Kaminiski, Colonel John F. McElhenny, Thomas Muldowney, Lt. Colonel Christ F. Potamos, John Rogalla, Nicholas Souchik, Major Gerald A. Vick, and Mary Wilson.

In addition, many participants provided useful materials from their personal files that were not found in other sources.

Newspaper accounts were found in the files of the Baltimore District Public Affairs Office and in the "Daily Clips" of the Office of the Chief of Engineers.

The following published works were consulted:

Barrett, Lucile T., and Edward Sanchez, "Camille and the Engineers," *Military Engineer*, LXI (November-December, 1969), 407-409.

*Congress and the Nation*. Volume III. Washington: Congressional Quarterly Service, 1973.

DeAngelis, Richard M., and William T. Hodge. *Preliminary Climatic Data Report, Hurricane Agnes, June 14-23, 1972*. National Oceanic and Atmospheric Administration Technical Memorandum. Asheville, N.C.: U.S. Department of Commerce, 1972.

Eisman, Eugene R., and W. Roy Newsome, Jr. "Pennsylvania Officials Review Lessons Learned From Emergency Housing Program Following Tropical Storm 'Agnes,'" *Journal of Housing*, XXX (January, 1973), 31-35.

Groves, Richard H. "The Agnes Disaster," *Military Engineer*, LXIV (November-December, 1972), 381-387, and LXV (January-February, 1973), 16-21.

Lewis, James L. "Federal Emergency Response," *Military Engineer*, LXVI (March-April, 1974), 100-103.

Milton, Larry L. "Disaster at Rapid City," *Military Engineer*, LXV (May-June, 1973), 189-191.

Striffler, Mary Ann. "Legacy of Agnes: The Road Back," *Water Spectrum*, IV (Winter, 1972-1973), 24-31.

U.S. Army, Corps of Engineers, Susquehanna

- District, North Atlantic Division. *After Action Report: Tropical Storm Agnes*. Harrisburg: December, 1972.
- . *After Action Report: Tropical Storm Agnes, Supplement*. Harrisburg: December, 1972.
- U.S. Army, Corps of Engineers, North Atlantic Division, "The Great Flood of 1972."
- U.S. Army, Corps of Engineers, Office of the Chief of Engineers, "Agnes."
- U.S. Department of Defense, "Agnes in Retrospect: Corps Tells What Happened, What Didn't," *Commanders Digest*, XII (November 2, 1972), 6.
- . "Corps of Engineers Leads Cleanup," *Commanders Digest*, XII (November 2, 1972), 1-5.
- U.S. Senate, Subcommittee on Disaster Relief of the Committee on Public Works. *Hearings, To Investigate the Adequacy and Effectiveness of Federal Disaster Relief Legislation*. 93rd Cong., 1st Sess., 1973.

## Acknowledgements

The author is deeply grateful to all those individuals associated with the Susquehanna, Philadelphia and Baltimore Districts of the U.S. Army Corps of Engineers and the Office of the Chief of Engineers, whose assistance made the research and writing of this book both pleasant and fruitful. Special thanks are owing to Robert J. Blake, Carolyn Brenneman, Frank Doyle, Henry G. Dunn, Dorothe M. Grand, Michael J. Lawrence, Gary A. Loew, Elizabeth H. Phipps, Agnes M. Riedel, Jesse A. Remington and Rose Wells.

Individuals interviewed by the author gave

enthusiastically and generously of their time. Their keen insights and reflections significantly enhanced the narrative.

General Richard H. Groves deserves special mention for his encouragement and suggestions. Others who read the manuscript were: Colonel William D. Horton, Colonel John F. McElhenny, General Louis W. Prentiss and Mary Wilson. Their comments were most helpful.

As always, my wife, Billie, gave invaluable support.

For the material presented and the conclusions reached, the author alone is responsible.



